The Philosophy of the Commentators, 200-600 AD

400 YEARS OF TRANSITION

The Philosophy of the Commentators, 200-600 AD

A SOURCEBOOK

Volume 2. Physics

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Sources

Many of the translations in this Sourcebook are new. Reprinted translations have been subject to revision, largely to harmonise choice of editions and of certain English terminology. They are mostly taken from the series *The Ancient Commentators on Aristotle*, ed. Richard Sorabji (Duckworth and Cornell University Press, 1987-).

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Jonathan Barnes, 'Ammonius and adverbs', *Oxford Studies in Ancient Philosophy*, supp. vol. 1991, ed. Henry Blumenthal and Howard Robinson, *Aristotle and the Later Tradition*, extract from Ammonius *in An. Pr.*

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R.W. Sharples, 'Science, philosophy and human life in the ancient world', in M.W.F. Stone, Jonathan Wolff, eds, *The Proper Ambition of Science, London Studies in the History of Philosophy* 2, Routledge, London 2000, 7-27, extract translated from Galen *Quod animi mores*.

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Preface and Acknowledgements

In 1996, the British Academy advertised a Research Chair in the Humanities and Social Sciences, the vacated half of one of the first two such chairs which had been donated by Lord Wolfson. It was to begin on 1 October 1996, the day after I finished a five-year term at the Institute of Classical Studies, and I was fortunate enough to be awarded it. Without this two-and-a-half year break, I would not have undertaken the Sourcebook.

The work was done in phases.

Phase 1: The initial phase involved preparing the first draft of the Sourcebook in time for a week-long international workshop held at the Institute of Classical Studies in the University of London in June 1997, and financed by the Institute and the University's School of Advanced Study, of which the Institute is a member. Some forty younger scholars attended from all over the world, in order to gain acquaintance with the Philosophy of the Ancient Commentators from the period 200 to 600 AD. The first draft was on the table and was also used by some of the speakers in preparing handouts.

In order to prepare the first draft, I selected topics and illustrative texts, in very much the format of the final version, adding brief introductory headings. Of my research assistants at that time, the work of typing up the available translations was started by Dolores Iorizzo, and then taken over by Sylvia Berryman, with a team of graduate students. It was a mammoth task to deliver the three draft volumes a week before the workshop.

The nineteen speakers at the workshop, in some cases, added their own handouts. They were: Sylvia Berryman, Victor Caston, Gillian Clark, John Ellis, Andrea Falcon, Barrie Fleet, Frans de Haas, Pamela Huby, Jill Kraye, Peter Lautner, Eric Lewis, Arthur Madigan, Mario Mignucci, Sara Rappe, David Sedley, Robert Sharples, Anne Sheppard, Lucas Siorvanes, and Richard Sorabji.

Phase 2: The main recommendation of the workshop participants was that I should add more explanatory narrative. This process led to the addition and subtraction of texts. Furthermore, only the minority of texts selected had been translated in our series, *The Ancient Commentators on Aristotle*, especially as the series was still at a comparatively early stage. So new translations needed to be commissioned, or translated by me when a translator was unavailable.

Phase 3: The resulting second draft was sent out for comment at the end of Summer 1999 to teams of specialists, to whom I am extremely grateful. The *Psychology* volume and the last part of the *Logic and Metaphysics* volume were reviewed by a team of scholars at the Institute of

Philosophy in Leuven: Jan Opsomer (organiser), Gerd van Riel and Guy Guldentops. The *Physics* volume was reviewed by such a team at Utrecht: Frans de Haas (organiser), Keimpe Algra and Peter Wieringa, with a further section undertaken by David Furley. For the *Logic and Metaphysics* volume, the translations concerning Aristotle's *Categories* were reviewed by Gary Matthews and Marc Cohen, the others by Richard McKirahan. The whole volume was reviewed, especially for content, by Jonathan Barnes, with one section undertaken by Angela Longo, and John Dillon gave me his *nihil obstat.*

The main conclusion from this review was that the translations by many hands would need more harmonisation. In the process of harmonising, I also substituted some interpretations of my own, so that the final versions are rather *based on* the work of the translators. I am very grateful to the translators for their work and I apologise for the alterations. Names and initials of translators are recorded in the table at the end of the volume. All translators will have had the opportunity to remain anonymous, if they found the alterations too irksome. Almost no translations remain in their original form, even though the changes have been kept to a minimum. In a few cases previously published translations have been used, or used as a basis, and I thank the publishers and copyright holders listed in the Sources for granting permissions.

I learnt much more from the valuable comments of the expert reviewers, and it was only at this stage of pulling the selections more tightly together, that I began to feel I had a picture of the philosophy as a coherent whole. I hope that the reader may share some of this experience, finding their own interconnections and contrasts when they read the texts side by side.

The complex revisions of the volumes were typed up and set in order by two research assistants with a remarkable ability to keep a grasp of details. David Robertson took responsibility for the *Physics* and *Psychology* volumes, Eleni Vambouli for the *Logic and Metaphysics* volume. Ian Crystal finished off some of the work on *Psychology* and Jennifer Strickland inserted final corrections with electronic supervision by Han Baltussen.

Phase 4: The third draft was sent to the publisher for further review in October 2000, and the draft also benefited from classes based on the Sourcebook at the University of London in 1999-2000, and at The University of Texas at Austin in March to May 2001 and 2002.

Phase 5: In a fifth phase of checking for accuracy, I have been enormously helped by the watchful eye of Devin Henry, and also by readings on the part of my colleague at King's, Peter Adamson, and by Cosmin Andron, Jan Opsomer, Guy Medigon, David Furley and Andrea Falcon, and, at proof-reading stage, John Sellars.

I should like to thank my colleagues in the University of London for the ease with which they accepted the proposal in the late 1970s that the nine hundred years after Aristotle should be included in the undergraduate syllabus. The only question I was asked was whether the Neoplatonists

after Plotinus would provide enough material. The Sourcebook is part of the answer.

The Sourcebook would not have been possible without the funding of the translations in the series *Ancient Commentators on Aristotle*, of which there are now over fifty volumes. For this I wish to thank the following: the National Endowment for the Humanities, Division of Research Programs, an independent federal agency of the USA, the Leverhulme Trust, the British Academy, the Jowett Copyright Trustees, the Royal Society (UK), Centro Internazionale A. Beltrame di Storia dello Spazio e del Tempo (Padua), Mario Mignucci, Liverpool University, the Leventis Foundation, the Arts and Humanities Research Board of the British Academy, the Esmée Fairbairn Charitable Trust, the Henri Brown Trust, Mr and Mrs Egon, and the Netherlands Organisation for Scientific Research (NWO/GW). A special grant towards the Sourcebook was provided by the Gresham Trust, to which I am very grateful.

It is hoped that the Sourcebook and the volumes of translation will complement each other. The published translations will provide extra annotation on content and text for some (not all) of the passages in the Sourcebook, while the Sourcebook will explain ideas touched on, sometimes briefly, in the published translations. Translations in the series are listed at the end of the volume.

Introduction

The Philosophy of the Commentators of 200-600 AD constitutes the transition from Ancient to Medieval Philosophy. The period started with the Aristotelian (Peripatetic) School battling against Stoics and Platonists. But soon Neoplatonism became dominant, swallowing up the other schools, while still displaying their influence, especially that of the Aristotelian, Alexander of Aphrodisias. He, like most of the others, did much of his own Philosophy through the medium of commentary on earlier Philosophy, and that is why the Greek philosophers of this period can be called commentators. Alexander's commentaries, and most but not all of the surviving ones, are on Aristotle.

Meanwhile, the balance of power shifted from Paganism to Christianity. The two sides stood in a love-hate relationship, which can sometimes be glimpsed in the commentaries. The theology and spirituality of Neoplatonism profoundly influenced Christian Philosophy. And so did the inward turn to find truth within oneself, started by the Stoics and developed by the Neoplatonists.

Neoplatonist Philosophy, which somehow used and harmonised the warring Greek schools of the past, proved very congenial to the Philosophy of at least two religious cultures, first that of medieval Islam from the ninth century to the end of the twelfth, and then that of medieval Latin-speaking Christianity from the late twelfth century onwards. If we skip from Plato and Aristotle to Descartes two thousand years later, or to Thomas Aquinas 1600 years later, we shall not understand the later thinkers, because they were influenced by what came in between. Thomas was avidly reading the commentators who had been and were being translated into Latin and was seeing Aristotle through their lenses.

The commentators were not only a source of influence for posterity. Their commentaries also provide a panorama of up to a thousand years of earlier Greek Philosophy, and they embed fragments of that Philosophy otherwise lost. Some of the commentaries represent classroom lectures and provide the historian with fresh light on teaching methods. They also contain Philosophy of very considerable interest in its own right. The Sourcebook will present the commentators' own philosophical ideas rather than presenting them just as commentators. They include much to stimulate modern philosophy students, arguments about determinism, or the beginning of the universe, for example. The ancient commentaries on Aristotle's *Categories* force the reader to think Aristotle's philosophy through to a level unmatched by modern discussion.

Now that there are over fifty volumes of English translation available

in the series *The Ancient Commentators on Aristotle*, it is becoming easier to identify previously unidentified writings as fragments of lost commentary, or as translations, especially into Arabic, of lost bits of commentary. Thanks to valuable discoveries by others, the available corpus is beginning to grow a little.

To return to the influence of the commentators, they are essential for understanding Medieval Latin Philosophy, since the Neoplatonist Commentators turned Aristotle's God into a Creator and endowed his human soul with immortality. Their motive was to defend the harmony of Plato and Aristotle against Christian charges of inconsistency. By an irony, this harmonisation finished up by making Aristotle safe for Christianity in the thirteenth century, when William of Moerbeke was showing his Latin translations of the commentators to Thomas Aquinas.

The commentators are also the source of major ideas previously thought to have been invented in the thirteenth- or fourteenth-century Latin West: the idea of impetus theory, hailed by Thomas Kuhn as a fourteenth-century scientific revolution, and the idea of intentionality which, in the nineteenth century, Brentano claimed to take from Thomas Aquinas' medieval followers and which he made a centrepiece of modern Philosophy of Mind. Galileo's early works mention the commentator Philoponus more often than they mention Plato. There will be fresh examples in this Sourcebook of medieval ideas deriving from the ancient commentators, for example the idea of latitude of forms in the *Physics* volume. Thus the commentators represent a missing link in the history of Western Philosophy.

The need for this sourcebook

The ancient Greek commentaries on Aristotle, edited by H. Diels for the Prussian Academy a hundred years ago, amount to some 15,000 pages. The present Sourcebook, as will be explained shortly, will go beyond the commentaries to other works by the commentators. So the relevant corpus is vast. In Diels' Germany such was the standard of Greek learning that H. Usener could review the massive series halfway through and K. Praechter when it was nearly complete.[1] But in the First World War, many of the next generation of potential Greek readers shot each other dead. Even with the fifty or more volumes now translated into English, it takes an expert to know which will be the volumes particularly relevant to his or her interests. Hence the need for a Sourcebook, to make the commentators accessible to the much wider readership which could find them interesting.

The selection

The commentators also wrote non-commentary works, and the Sourcebook draws equally on these since the two kinds of work throw light on each other. In addition, besides the Greek commentaries edited by Diels, there are commentaries lost in the original Greek, but surviving in other lan-

guages, especially often Arabic, Hebrew, or Latin. Where the surviving version has passed through one or more than one language, the task of retroversion to work out the original Greek is especially difficult. Translations of some of these texts will be included in our selections.

The commentators wrote commentaries on Plato, but the surviving corpus is incomparably smaller and had already been partly translated.[2] But there are plans for a new English translation of the important commentary by Proclus on Plato's *Timaeus* by Harold Tarrant, Dirk Baltzly and David Runia, and for a new French edition and translation of the same by Jan Opsomer. There will also be translations of other commentaries on Plato, including, it is hoped, Proclus *in Crat.* in the series *Ancient Commentators on Aristotle*, and a good number of the commentaries on Plato are represented in the Sourcebook.

The Neoplatonist commentators often find the start of a problem in Plato. But because Plato wrote dialogues, he tends to put into the mouths of his characters many different suggestions, without seeking any unifying solution across his works. The Neoplatonists, however, thought Plato was conveying a solution, and so not surprisingly they were able to disagree on what the solution was. Aristotle was the very opposite of Plato. He strives for consistency across his works. Moreover, unlike Plato, he is not content to raise problems and explore them, but endeavours to find definitive solutions. It is for different reasons, then, that the commentators disagree on what Aristotle thought, not least because of the preposterous, but fruitful, Neoplatonist idea, to which I shall return, that Plato and Aristotle were in basic agreement.

A further major influence on all the commentators was Stoicism. Alexander and the Neoplatonists alike had to oppose or incorporate Stoic ideas.

The Sourcebook is not intended to be an introduction to Neoplatonism, both because Aristotelians (also known as Peripatetics) and Christians are to be covered as well, and because under the Neoplatonists the commentaries on Aristotle formed the introductory part of the student philosophy syllabus. Matters of higher theology were not so likely to be treated here as in the commentaries on Plato, especially on his *Timaeus* and *Parmenides*, which formed a later part of the syllabus, or in non-commentary treatises. Although these texts will also be quoted, the emphasis will be more on philosophy than on theology.

In selecting what will interest readers, one has to be guided by current biases. A hundred years ago, when Idealist philosophies were very popular in English-speaking countries, much more of Neoplatonism would have seemed obviously relevant. The central doctrines of Neoplatonism will appear here, but divided up among different philosophical topics. Someone seeking to introduce Neoplatonism might put in the forefront Plotinus 4.8 [6] 1, his personal experience of how soul relates to Intellect, 4.8 [6] 8, his personal hypothesis on our undescended soul, 5.3 [49] 1; 10-13 on why we need to believe there is a One as well as Soul and Intellect, and 5.1 [10] 10, summarising these three realities. All those ideas will appear. But just as

the ancient enterprise of commenting on Aristotle imposed an Aristotelian order on what the Neoplatonists said, so analogously with this modern Sourcebook. The topics and sub-topics chosen represent partly ancient and partly modern interests. The central ideas of Neoplatonism will appear, but I shall approach them from the direction, currently more familiar, of Aristotle's interests.

The organisation will be by topics and sub-topics, with concepts explained only so far as necessary for a first understanding. The topics are grouped into three volumes, corresponding to Psychology (with Ethics and Religious Practice), Physics, and Logic and Metaphysics.

One surprise in preparing the Sourcebook has been finding how often it seemed necessary to quote someone who is not nowadays thought of as a commentator at all, Plotinus. The commentators mention Plotinus chiefly for those few issues on which they disagree with him, but otherwise tend to leave him in silence. Yet often, it turns out, Plotinus is the only extant source which explains the background ideas that the Neoplatonist commentators were discussing. This might not be so true if more had survived of the commentaries of his pupil and editor, Porphyry. It may seem very much to distort Plotinus to chop his discussion into little bits for a Sourcebook. For he is a philosopher who excels in wrestling at length with a problem, seeing new objections, and new analogies to answer them. How can he be represented by snippets? Yet Plotinus describes himself as merely a commentator on Plato's words, when he explains the three fundamental levels of reality, 5.1 [10] 8 (12). And it has been remarked that later commentators treat Plotinus as just one among other commentators on Aristotle, e.g. 'Philoponus' *in DA* 535,8-12; Simplicius *in Cat.* 2,3-5; Simplicius *in Phys.* 706,25-8; 769,6ff.; 791,27ff.[3] So if treating him as a commentator is a distortion, it is an old distortion, and one he sometimes invited.

A bigger surprise awaited me when I read the selected texts assembled for the first time side by side. The selection was made out of interest in the individual topics. But read side by side, the texts revealed themes and concepts running through disparate texts. Not only these agreements, but also disagreements became more obvious. There are disagreements within a school and agreements between schools. Again, as regards the Neoplatonists a hierarchy among the chosen subjects became apparent, with Psychology at the summit, as we shall see, influencing the treatment of Physics, Logic and Metaphysics. It became necessary to begin harmonising the translations by different hands, to bring out the common themes and concepts. And it became possible to start rewriting the narrative, to show the interrelations and contrasts within the bigger picture. These processes could last a lifetime. But it seemed more useful to invite readers to join in the process themselves. I believe that readers will find their own interconnexions and contrasts when they read the texts side by side.

I hope the assembly of materials will facilitate much better interpretations of the texts. Certainly, the interpretations provided or implied by the

selections here should not be regarded as final, even if there were such a thing as a final interpretation. And this brings me to what the Sourcebook cannot do.

What the Sourcebook can and cannot do

I have already said that the Sourcebook is not a general introduction to Neoplatonism. It also faces the opposite problem from that tackled in the admirable Sourcebook for an earlier period, A.A. Long and D.N. Sedley, *The Hellenistic Philosophers*. Instead of there being too little material surviving, there is too much. Thus it cannot treat in depth every topic raised, nor cover every topic. It is meant to offer not the last word, but a first assembling of texts, to make them accessible, so that others can make new discoveries, offer new interpretations and fill gaps.

Another thing which the Sourcebook does not aim to do is to establish a canon of texts. That would be most undesirable. It is an introduction, a way of first getting into the commentators' philosophy.

There is a very wide range of people who have not specialised on the commentators, but to whom they are relevant. One example would be the philosophy professor who wants to see what would be interesting for his or her class. The book is intended also to help specialists in other related fields: Islamicists, Latinists, theologians, historians of science, scholars of other types of commentary or of commentary in other languages, and Medieval or Renaissance scholars, to name but a few.

Although the commentators will be treated as of interest in their own right, scholars whose interest is rather in the texts of Plato and Aristotle commented on will find that there is a very great deal to be learnt from the commentators' discussions. It will frequently be important to check what the commentators have to say. This is even more true of the more fragmentary authors preserved by the commentators, since the context of preservation can shed precious light on the meaning of the fragments.

A bibliography up to 1990 is supplied in the collection of essays, Richard Sorabji, ed., *Aristotle Transformed: The Ancient Commentators and Their Influence*, London & Ithaca NY. That work proceeds commentator by commentator, rather than by topics, and offers historical and methodological background rather than illustrating philosophical content. It should be treated as complementary and its content will not all be repeated here. More recent bibliography is planned for 2004.[4]

The commentators

Although Aristotle's immediate pupils discussed and developed his work, it was three hundred years later in the first century BC that commentaries on Aristotle got going. Of the early commentaries we have only fragments. They focused on Aristotle's *Categories*, which was also an object of attack. Sooner or later, it was asked why Aristotle named precisely ten categories,

when Plato was content with a twofold distinction between relatives and what exists in its own right. Could not categories other than substance all be treated as relatives, e.g. quantities like large, qualities like good at boxing, acting, being acted on, posture, when, where, and having on or wearing? That might depend on whether we take Aristotle's second definition of relatives in *Cat.* 7, which is narrower than the Platonic one. It might also depend on whether Aristotle's classification is of things, words, or concepts, for grammatical distinctions are very numerous.

The earliest commentaries on Aristotle still extant are by members of the Aristotelian (or Peripatetic) school in the second century AD. Those of Aspasius and, from the end of the century, Alexander of Aphrodisias are quoted in the Sourcebook, but from Aspasius we have only a commentary, not very comprehensive, on Aristotle's *Nicomachean Ethics*. Alexander, by contrast, the Aristotelian chair-holder in Athens, provides the most systematic development of Aristotelianism, written around 200 AD so as to bring the system up to date in relation to contemporary opponents. Substantial portions of the two lost commentaries by Alexander, on Aristotle's *Physics* and *On Generation and Corruption*, have recently been discovered, one in Greek and one in medieval Arabic, and translations will appear in the series *Ancient Commentators on Aristotle*. A newly found inscription by Alexander honouring his father confirms that he held the official chair as Aristotelian successor in Athens.[5]

To the Stoics, Alexander sometimes responded with outright opposition, e.g. over the right form of logical syllogism, but sometimes by implying that Aristotle already knew what the Stoics were saying. For example, the anti-Platonic distinction of mere appearance from actual belief is presented by Aristotle in terms of belief's involving conviction based on reasons. But Alexander instead borrows the Stoic account of belief based on the idea that reason *assents* to appearance.

Alexander attacks the Platonist belief in the reality of universal Forms, and his downgrading of universals, which goes well beyond Aristotle, proved surprisingly influential with Neoplatonists at one level, even while they defended the reality of Forms at another. Another opponent of Alexander, who leaned in the direction of Platonism, was the eclectic philosopher-doctor Galen with whom Alexander disagreed on dynamics and on time.

Occasionally, Alexander defends Aristotelianism by criticising Aristotle's argument as fallacious, if necessary.[6]

Alexander, and the treatise *Mantissa*, much of which may be by Alexander, had a considerable influence on the founder of Neoplatonism, Plotinus. It fitted Plotinus' views that Alexander interpreted the active intellect which Aristotle located in humans as being God resident within us. The *Mantissa* distinguishes the way in which the ordinary human intellect and the simple divine intellect are self-aware. Plotinus echoes Alexander's account of human self-intellection, but reserves total simplicity for a divinity higher than the divine Intellect, namely the One.

Plotinus discussed Alexander in his seminars in Rome in the mid-third century AD, but he also knew Aristotle's critics and made use of them. He complained that Aristotle's categories did not cover the all-important Platonic Forms, 6.1 [42]. A better classification of reality was Plato's distinction in the *Sophist* of five Great Kinds, 6.2 [43]. Even for the sensible world, only four of Aristotle's categories were useful, and that in modified form, 6.3 [44].

But in a decisive move (I follow here the standard interpretation), Plotinus' pupil, editor and biographer, Porphyry, restored Aristotle to the syllabus of Western literature once and for all. Aristotle's *Categories*, he said, was not about things, but about words insofar as they signify things, and words get applied primarily to the sensible world, not to the world of Platonic Forms.

Porphyry wrote commentaries on many of Aristotle's works and an Introduction (*Isagoge*) to Aristotle. Neoplatonist commentaries, from here on, with a few exceptions, increasingly represent the lecture courses given to students.

Porphyry also wrote probing inquiries into the religions of Christianity, of his fellow-Platonists, and of the Egyptians. I shall come to his *Against the Christians* later. In *On Abstinence from Killing Animals*, he criticised his fellow-Platonists for sacrificing and eating animals. He studies in turn the nature of animals, of the gods and of humans, to show that these practices cannot be justified on any ground. I regard this as one of the most interesting philosophical works of late antiquity, and it is translated in the series *Ancient Commentators on Aristotle*. In his *Letter to Anebo*, now fragmentary, Porphyry respectfully questions the practices of Egyptian religion.

Iamblichus was a reforming prophet. He seems to have attended Porphyry's lectures, though he proved a disrespectful pupil, and certainly not a disciple. On the harmony of Plato and Aristotle, if on little else, Porphyry and Iamblichus were allied. But they quarrelled on religion, even though Porphyry's probing of religious practice and belief was extended against the Christian religion as well as against the Egyptian religion which Iamblichus revered. Iamblichus' most important religious work, *On the Mysteries of the Egyptians*, is a defence of pagan ritual and sacrifice in reply to Porphyry's *Letter to Anebo*. It is written in a magisterial tone as coming from the Father of God, an Egyptian religious designation. Porphyry is addressed as 'you', and castigated as not even a good Platonist. Iamblichus thinks that Porphyry was looking for explanations of religious practice at too naturalistic a level beneath the divine.

Iamblichus set up his school at Apamea in modern Syria, in a beautiful site adorned later in the fourth century with mosaics by the Emperor Julian during his brief attempt to revive paganism. The mosaics, as I believe (*Aristotle Transformed*, ch. 1), represent the Rhetoric as well as the Philosophy faculty in the university where Iamblichus had earlier taught. Iamblichus died probably just before Constantine made the Empire Chris-

tian, founding Constantinople in 324, and summoning the Council of Nicaea in 325, which *inter alia* reaffirmed Christian opposition to animal sacrifice. Against this, the Emperor Julian's attempt at revival in 361-2 did not succeed.

As regards the harmonisation of Aristotle with Plato, Iamblichus went further than Porphyry, since he regarded Aristotle's categories as fitting not only the sensible world, but also the intelligible world of Platonic Forms. This required a higher interpretation, which he called 'intellective', of Aristotle's *Categories*, in parallel with the higher interpretation of religious practice. Iamblichus' pupil, Dexippus, however, reflects the Porphyrian, more than the Iamblichan, interpretation of Aristotle's categories. Iamblichus also took harmonisation further through a thoroughgoing attempt to integrate Pythagoreanism with the philosophies of Plato and Aristotle. Iamblichus further established the standard curriculum of twelve dialogues of Plato, to be read by students after the selected treatises of Aristotle, in a sequence designed for religious purposes, to lead to union with God.

In the fourth century, Themistius was a very different sort of commentator. He was an orator, politician and essayist in the capital city of Constantinople, and devoted only some of his time to Philosophy. He wrote shorter paraphrase commentaries, which, however, still offer distinctive interpretations, for example of Aristotle's definition of change, where he saw that it mattered which of several potentialities Aristotle meant to refer to. He has similarly distinctive ideas on concept formation, space, time and the continuum, and his attacks on Galen on space and time provoked replies in later commentators. His acquaintance with Neoplatonism shows through, and we sometimes see him siding with the Platonists against the Aristotelians, e.g. when he argues that Platonic Forms are needed to explain biological reproduction, *in Metaph. 12*, quoted by Averroes, translated in **Physics 1(b)** (16). Despite being different from other commentators, Themistius proved extremely important. We see him responding to Plotinus and allowing individual human intellects, *in DA* 103,32-104,6, at **Logic and Metaphysics 17(e)** (5). The importance of this is that Thomas Aquinas in the thirteenth century supported himself in his controversy against followers of Averroes by citing Themistius as allowing for the immortality of individual human intellects. It is further to Themistius' credit that he was aware that pseudo-Archytas' *Categories*, much trumpeted earlier in the century by Iamblichus as Aristotle's source, was not written before Aristotle by the Pythagorean Archytas (so Boethius *in Cat. PL* 64, 162 A-B).

In the early fifth century, Plutarch of Athens, who died in 432 AD (not the earlier Plutarch of Chaeroneia), provided a house in Athens for the Neoplatonist school, which archaeologists believe they have found. He and his pupil Syrianus, who was probably more critical of Aristotle than the other commentators, both taught the young Proclus. It is recorded that the works of Aristotle were known as the Lesser Mysteries, being introductory

to the Greater Mysteries of Plato. In Proclus' commentaries there is already visible the division into portions long enough for a one-hour delivery, and into separate discussions first of the doctrine and then of the wording of each Aristotelian passage. Proclus was encouraged by Plutarch to base a commentary on Plutarch's lectures on Plato's *Phaedo*, and he based his commentary on Plato's *Timaeus* on the lectures of his teacher, Syrianus. This commentary has for the Sourcebook proved the most important of the non-Aristotle commentaries.

Proclus presented himself as a holy man, capable of miracles, and purified himself with sea bathing even in winter in old age. He often opposed Plotinus. He rejected Plotinus' idea that part of our soul has never ceased from its uninterrupted contemplation of the Platonic Forms. And he rejected Plotinus' attempt to downgrade the reality of evil by equating it with an amalgam of Aristotelian matter and privation. Evil is something more active for Proclus, which parasitically feeds on the good.

In the fifth century, the future of Neoplatonist teaching began to be cemented by pupils taking over the headship in Athens or Alexandria, and even by marriage. Hermeias, who headed the school in Alexandria, married a relative of his teacher Syrianus, a relative originally intended for Proclus, while Hermeias' successor was his son Ammonius, who first studied with Proclus.

In the late fifth and early sixth centuries in Alexandria, Ammonius taught the most brilliant of the remaining Neoplatonists of both the Alexandrian and the Athenian schools, with the exception of the disaffected Damascius who started in Alexandria as a rhetorician, turned to Isidore, not to Ammonius, for philosophy, and fled with Isidore from Alexandria after the violent persecution in 488-9 of Neoplatonists by Christians. Ammonius did, however, teach Philoponus, Asclepius, Simplicius, and probably Olympiodorus. The first two wrote a number of commentaries 'from the voice of' Ammonius, in other words, based on the lectures of Ammonius, as were Proclus' in at least one case on those of Syrianus.

Although we shall see that Praechter was wrong to suggest that the Alexandrian Neoplatonists diverged from the Athenian by adopting Christianised monotheism, nonetheless Ammonius did introduce some changes of direction. I shall come later to his lack of interest in the magic of names. What is relevant here is his attitude to Aristotle. Syrianus in Athens, while expressing great esteem for Aristotle, had thought it necessary to oppose him head on concerning certain subjects (*in Metaph.* 80,4-81,14). He and his pupil Proclus saw that Aristotle disagreed with Plato both on the existence of Platonic Forms and on God's role as Creator. They both argued that Aristotle ought, on his own principles, to have agreed with Plato (Syrianus *in Metaph.* 117,25-118,11; *ap.* Asclepium *in Metaph.* 433,16; 450,22; Proclus *in Tim.* 1, 266,28-268,24).

Ammonius turns this around. He held that Aristotle actually did accept Plato's Forms, at least in the guise of principles (*logoi*) in the divine Intellect (Asclepius, *in Metaph.* 69,17-21, from the voice of Ammonius; cf.

Zacharias, *Ammonius, PG* vol. 85, col. 952 Colonna). And he wrote a whole book designed to show that Aristotle actually drew the conclusion that God was the efficient cause of the world's existence, using some of the same arguments Proclus said he should have used. Certain relevant passages are translated in **Physics 8(c)** and **(d)**.

It would be wrong to deny that the works of both Plato and Aristotle were taught in both the Athenian and Alexandrian schools. And indeed Ammonius will have used Proclus' lost commentary on Aristotle's *On Interpretation*. But the extant commentaries of Syrianus, and of his pupils Proclus and Hermeias, and those of Damascius in Athens are on Plato, while those by, or from the voice of, Ammonius in Alexandria are on Aristotle.

Philoponus was a Christian and philosophically the most brilliant of all the commentators. He increasingly used Neoplatonist doctrine, in which he was steeped, to make the case for Christianity against the pagan Neoplatonists. In 529 AD he published what I would regard as another of the most interesting philosophical works of Late Antiquity. His *Against Proclus On the Eternity of the World* proves that pagan principles support the Christian belief in the beginning of the universe. This text is also being included in the series *Ancient Commentators on Aristotle*. Philoponus introduces the argument, sometimes wrongly credited to St Bonaventure in the thirteenth century, that even the pagans must admit that Christianity is right that the universe had a beginning, because they cannot afford to allow that past years, and a fortiori past days, reach and will exceed infinity. His Christian ideas are reflected also in his commentaries on Aristotle, and the writings add up to a Christian alternative to Aristotelian science (Richard Sorabji, ed., *Philoponus and the Rejection of Aristotelian Science*). As regards the Aristotelian idea of prime matter as the ultimate subject of qualities, Philoponus substitutes the idea of featureless extension which serves as a field for the qualities. This three-dimensional extension acts not only as the basic matter of bodies, but also as the form by which body is defined.

Philoponus also made major contributions to dynamics. He can be regarded as the inventor of the force called impetus, which Thomas Kuhn treated as a scientific revolution of the fourteenth century. He is praised by Galileo for his very effective arguments for the possibility of motion in a vacuum, which would not, as Aristotle alleged, call for infinite speed. And he reports experiments with the speed of fall of bodies of different weights.

AD 529 was a fateful year. St Benedict founded the monastery at Monte Cassino and the Christian Emperor Justinian closed the Athenian Neoplatonist school. Damascius, its then head, displayed an originality concerning time as discontinuous, prime matter, the causal mechanism of procession (**Physics** volume), pleasures of the mind as activities and thinking as distinct from its objects (**Psychology** volume), often by way of correcting Proclus. His escape from Christian persecution in Alexandria and subsequent career has been vividly described by Polymnia Athanas-

siadi, who thinks the house used by Damascius for the school, distinct from Plutarch's, can be identified among the excavations.[7]

The fate of the seven Athenian philosophers, including Simplicius and Priscian, after their brief removal to the court of Chosroes at Ctesiphon in modern Iraq, is a subject of much discussion. The attractive idea that the Athenian School did not disappear from the map of history depends, unfortunately, on circumstantial evidence none of which is conclusive. According to this view,[8] Simplicius at least (some say the others too) went to Harran, a site in modern Turkey, from where in the ninth century a mathematician-philosopher came to Baghdad and was appointed (on this view because of his Harranian learning) to facilitate the Arabic revival of the Neoplatonist commentary tradition. Be that as it may, Simplicius wrote the most informative commentaries of all, after 529 AD, commentaries which have the leisure to give the most comprehensive survey available of the course of Greek philosophy, and which include bitter comments on the irreligion of the faithless Christian renegade, Philoponus. Simplicius' commentary on Aristotle's *Categories* incorporates the most thorough critique known to me of the basic metaphysics that Aristotle propounds in that work. His commentary on Aristotle's *Physics* contains two excursuses on place and time, whose interest matches that of the excursuses on place and vacuum in the *Physics* commentary of Philoponus.

Thanks to Ammonius, the Alexandrian school continued, but Olympiodorus, in the mid-sixth century, was the last pagan head. Elias and David were Christians, whose extant commentaries are shrunk down to the logic part of the syllabus, which is perhaps all the Christian students were expected to learn. If Stephanus, who probably continued into the seventh century, is the author of the Greek commentary on Book 3 of Aristotle's *On the Soul* attributed to Philoponus (and the recent translation of this work may help to support this conjecture), then there will have been a modest, but temporary, re-expansion of interest.

The revival of the commentary tradition was due above all to the Arabic world of ninth-century Baghdad, where al-Kindi master-minded translations of Greek texts, often via Syriac. A further revival came in the twelfth century, when Arabic texts from Spain as well as Greek texts from the Byzantine world were translated into Latin. The continuing translations were to be used, among others, by Thomas Aquinas in the thirteenth century, with important results for the tradition. The extent to which the commentary tradition was advanced before that in the Byzantine world between the seventh and the twelfth centuries is only now beginning seriously to be explored. The only two late Byzantine commentators quoted in the Sourcebook are Eustratius in 1050/1060 – *c.* 1120 AD and Michael of Ephesus, who in 1138 AD or later, was made by the Princess Anna Comnena to assemble and supplement the commentaries on Aristotle preserved from a much earlier date. Michael's collections of pseudo-Alexander commentary have been most fully studied by Sten Ebbesen. Michael's own commentaries on Aristotle's *Nicomachean Ethics* and on the biological

works, which had been omitted from the earlier curriculum, tend to be in the style of Alexander rather than of the Neoplatonists.

Obviously, translation played a major role in this transmission, but as Carlos Steel has made clear, the environment has to be receptive as well, if translation is to have this kind of influence.[9]

Neoplatonism

I have already said that the Sourcebook focuses on the Commentators, not on Neoplatonism. But most of the commentators are Neoplatonists, and Neoplatonism is much less widely studied nowadays than Aristotelianism. So to many the commentators' Neoplatonism will seem unfamiliar. Can it be made more familiar?

Charles Taylor in *Sources of the Self*, Cambridge 1989, ch. 7, has described a radically reflexive stance which is very familiar to modern philosophers because it is the stance of Descartes. It attends to our own experience and sees this as the source of truth. The only thing is that Taylor, followed by others (e.g. Phillip Cary, *Augustine's Invention of the Inner Self*, Oxford 2000), ascribes to Augustine the shift to this radically reflexive stance, whereas, with one exception, everything that Taylor uncovers in Augustine was already in Plotinus, who in turn draws at least his *terminology* for self-awareness from the Stoics, and in fact more than terminology, since Epictetus *Discourses* 3.22.38-9 says that we find preconceptions about the good within ourselves, and Cicero borrows from the Stoics when he says in connexion with natural law and justice, *On Laws* 1.22.58, that one finds them within (*in se*), cf. also *Republic* 3.22.33.

Augustine tells us that he learnt his methodology of looking inwards from 'the books of the Platonists', *Confessions* 7.10.16. Plotinus and Porphyry were his main sources for this. Augustine may in addition be influenced by Cicero, when he offers a view of natural law as written in our hearts and impressed on us, though for this he draws also on Romans 2.14-15, at *Confessions* 2.4, and *On Free Choice of the Will* 1.6.15.

The exception is that Augustine is the first person we know to have produced the *cogito* arguments, later made famous by Descartes, although even here Augustine may have been partly inspired by Porphyry when he *applies* the *cogito* to arguing that we can know that our soul is incorporeal. One example, from almost a dozen, of Augustine's use of the *cogito* is given under **Psychology 4(f)** and **6(b)**.

Augustine's use of Plotinus in no way impugns his originality. Putting old material to new use is a form of originality, which Augustine also displays elsewhere. But what it does mean is that it is Plotinus and the Neoplatonists, and in a preliminary way the Stoics before them, who really introduce into Western Philosophy Taylor's radically reflexive view so familiar from Descartes. We see how important Plotinus thought it that the objects of Intellect should be *within* the Intellect from the debate that Porphyry reports in his *Life of Plotinus*, chs 18, 20 (**Psychology 3(k)**). In

Plotinus' seminar, Porphyry was made to debate the question and only converted to Plotinus' view after two replies by his fellow student Amelius.

Admittedly, Proclus later disagreed with Plotinus' view (*in Parm.* 948,14-20) because he took it to be allied with Plotinus' belief that part of our soul never ceases its unconscious contemplation of the intelligible Forms. But Proclus *in Alc. 1* 5,13-14, following Iamblichus *ap.* Proclum *in Alc. 1* 11,11-17, and like the *Anonymous Prolegomena to Platonic Philosophy* ch. 26, holds that the starting point for Plato and the whole of Philosophy must be the Delphic saying 'know thyself', studied in Plato's *First Alcibiades* (translations in **Psychology 15(a)**). This fits with Plotinus' insistence, which influenced Augustine, that we must look for the chief divinities, the Intellect and the One, *within* ourselves, 1.6 [1] 9 (8); 5.8 [31] 10 (31-43); 6.9 [9] 7 (16-23), translated in **Psychology 15(b)**. Plotinus' most famous autobiographical account of his experience of union with the Intellect in 4.8 [6] 1 (1-11) starts by saying that he has often withdrawn from everything else into himself. Even the phenomenological character of the experience is taken to indicate how things really are. There is not merely a sense of timelessness; the Intellect, and one's self as united with it, are really timeless, 3.7 [45] 11. There is not merely a loss of sense of where one's own boundary stops and that of Intellect or the One begins, 6.5 [23] 7 (14-17); there is genuine union. Plotinus holds more generally that the source from which something stems is within it, and he applies this to the hypostasis Intellect: 'For in turning back (*epistrephein*) on itself, [Intellect] turns back on its source' (Plotinus 6.9 [9] 2 (35-6); tr. BF).

Cary (op. cit., ch. 3) has argued for Augustine's invention of the Inner Self, and has distinguished Augustine from Plotinus as inviting us to look not only in ourselves for God, but first in and then up. But not only does Plotinus also recognise more than one level. (The characteristic ratiocinative self is below the intellect of soul, which is a higher self; there are many levels of self; the human Intellect is in turn derived from the divine hypostasis Intellect; the One is beyond Intellect again; see **Logic and Metaphysics 18(a)**). But more importantly, Plotinus puts more into the inner world than Augustine, since he locates everything divine within. Only the sensible world, as described in the **Physics** volume, and in the earlier part of **Logic and Metaphysics**, remains outside.

There is another contribution of Neoplatonism, which is a contribution of the whole period 200-600 AD. It addresses some questions which we ought to address, but do not, or not sufficiently. For example, the Christian world traditionally believes in life after death, and accordingly some aspects of this question are much discussed by modern philosophers: would disembodied consciousness be possible? What would make the supposedly revived future person to be me, rather than someone else? But other relevant questions have been relatively neglected, and at these points, where late antiquity may seem to us to be at its most outlandish, we should instead see the need to address the questions. If, as the Christian tradition holds, we shall have new bodies in the next life, what kind of bodies would

be appropriate to such different conditions? Here the easily ridiculed discussion of Platonic physical vehicles is relevant. Would such a life be even tolerable for humans, let alone superior? Here the ascetic practices of late antiquity, pushing human possibilities to their limits, which may seem so alien, are highly relevant. If the life in question is instead disembodied, might it be a life outside of time altogether? The idea that space and time might in any case be the less real products of a more profound reality has indeed been endorsed by the modern physicist David Bohm (*Wholeness and the Implicate Order*, London 1980), and in a joint seminar with myself and Clive Kilmister at King's College London, he considered the Neoplatonists to be expressing exactly his own view.

The transformation of Plato and Aristotle

In Neoplatonism, though not in Aristotelianism, Plato and Aristotle are transformed in a variety of different ways. The transformation is partly driven by a wish to harmonise Plato and Aristotle, but only partly. There is less effort to harmonise the two in some commentators than in others, and on some issues, we shall see, there is less harmonisation among our commentators than there was in the Middle Platonism of an earlier period. Further, the transformation of views is driven by other factors too besides harmonisation.

Harmonisation is most marked in Porphyry and Ammonius. It seems to be least favoured by Syrianus and Proclus. Simplicius says that the good commentator should find Plato and Aristotle in harmony on most points, *in Cat.* 7,23-32. The presumption for a Neoplatonist is that, in case of disharmony, it is Plato who will be right. But even this is reversed by a late commentator, Olympiodorus, who backs Aristotle against Plato on the definition of relatives, *in Cat.* 112,19ff.

As an example of harmonisation, we have seen that Porphyry, on the standard interpretation, harmonised Aristotle's categories with Platonism. Hereafter, it became increasingly useful to reinforce the myth of harmony in the face of Christian charges that pagan philosophers contradicted each other. As already mentioned, there was an irony in this, because the harmonisation, whose motive was thus partly anti-Christian, finished in the thirteenth century by helping Thomas Aquinas to present Aristotle as safe for Christianity, since the assimilation to Plato had turned Aristotle's God from a thinker into a Creator, and Aristotle's human soul into an immortal one.

One might have thought that the pressure towards harmonisation would be bad for Philosophy. Having to convince the Christians that Plato and Aristotle agreed with each other on almost everything would surely lead to loss of their wonderful insights. But in fact it gave a distinctive character, interesting in its own right, to Neoplatonism. And, curiously, it led to an even closer reading of the texts of Plato and Aristotle, because their texts had to be read very closely indeed, if one was going to argue that

what they really meant was something different from what at first sight might appear. Another example of pressure being fruitful, instead of destructive, was offered by Edward Grant (*Viator* 10, 1979). In 1277, just after the death of Thomas Aquinas, Bishop Tempier of Paris condemned 219 philosophical and theological propositions. One might no longer say that it was beyond God's power to move the entire physical universe sideways. What on earth would this mean? Were the philosophers being forced into talking nonsense by the imposition of clerical correctness? Not at all, says Grant. The need to avoid the condemned propositions proved a valuable stimulus to the imagination about how to think of space and time. Whether or not this is true of the 1277 condemnation, I think that something of this kind happened earlier with the Greek Neoplatonist commentators. They took Plato to postulate a changeless and timeless world of divine Platonic Forms and they had to think out how such a world would relate to the temporal, changing world described by Aristotle.

I should like now to look at some examples of what happened to the views of Plato and Aristotle in Neoplatonism, to see what factors besides harmonisation are at work, whether Plato is transformed in the process as much as Aristotle, and where the transformations were important for subsequent Philosophy.

It is difficult to harmonise Plato with Aristotle on certain issues concerning rationalism versus empiricism. In the *Theaetetus* 186A-187A, Plato maintains that perception can do practically nothing at all without the aid of reason, and the Middle Platonist, Alcinous, elaborates this view in his *Didaskalikos* ch. 4, to maintain that there would be no perceptual recognition without reason. So far this rejects Aristotle's view that perception is entirely separate from reason and that animals can get along very well by using perception on its own, while completely bereft of reason. But a qualification is that the relevant kind of reason, for Alcinous, is empirically based and manifested in opinions (*doxastikos logos*).

To take another example, Plato holds in the *Phaedo* that our concepts are recollected from a life before our birth and stored in our rational souls. Aristotle, by contrast, argues in the last chapter of his *Posterior Analytics* that the most rudimentary universal concept of (say) an ox is based on nothing more than many memories of perceived oxen, and that perception already grasps universal concepts, though intellect plays a role at some stage. How can these very different views of the competence of perception as opposed to reason be harmonised?

The Platonists go several different ways on this issue. Some, starting with the Middle Platonist, Alcinous (*Didaskalikos*, ch. 4), accept both Aristotle's concepts and Plato's, while often regarding the latter as more accurate. Others, starting with Syrianus and Proclus and continuing with Simplicius and Olympiodorus, though listing Aristotle's concepts, attack them, especially in geometry, as unable to do the necessary work. A third manoeuvre is the claim of Iamblichus, Philoponus and perhaps Plutarch of Athens, that Aristotle himself accepted Plato's pre-nate concepts alongside

his own empirically gained ones. This is explained in **Psychology 5(b), (c)** and **(d)** and **Logic and Metaphysics 5(c)** and **12(b).**

As for perception, Priscian repeats that empirically based reason, *doxastikos logos*, is required for perceptual recognition. But the late Neoplatonists give a further role to *logos*, now in the sense of a concept. Perceptual recognition cannot occur unless the recollected Platonic concepts are projected from the mind, to make the recognition possible. So far, the harmonisation concerning the first issue, concepts, has been mixed. Despite some harmonisation, and positive support from Philoponus, a tendency among some Neoplatonists has been rejection of Aristotle's account of concepts. On the second issue, perception's independence from reason, rejection of Aristotle has been complete – perceptual recognition cannot occur without reason. But the concept of reason has been modified. In some cases, an empiricist concept of reason has been substituted. In other cases, Plato's insistence on the need for reason has been defended by means of a theory of projecting concepts which goes far beyond Plato.

There is a third issue, also connected with the dependence of perception on reason. How are we aware of our own mental activities? Discussing awareness of our own perceptions, Aristotle says that this is effected by a perceptual faculty, the so-called 'common sense'. But Proclus objects that, besides perception, we also have, and are aware of, reason and different kinds of desire. Surely awareness of all these diverse activities must be assigned to something higher than the common sense. 'Simplicius' *in DA* comes to Aristotle's aid. The common sense can indeed be aware of this great diversity of activities, he says, if we once recognise that human common sense is permeated by reason. This answer is perfectly congenial to the Platonist tradition, which, starting from Plato's *Theaetetus*, regards perception as dependent on reason. But to Aristotle this defence of his reference to the common sense would be anathema. As the great biological taxonomist, he wanted to show that perception was independent of reason and could be used to mark off the animal kingdom. Aristotle loses again in this harmonisation.

But Aristotle does not always lose. Something very unexpected happened in the commentators' discussion of universals. Plato introduced the idea of Forms or Ideas, and these were understood by Aristotle and by other schools in the following centuries to be universals which somehow transcended the physical world and yet explained the acquisition of properties by things in the physical world. This Platonic account of universals was condemned in turn by Aristotle, by the Stoics and by Aristotle's great protagonist, Alexander. Aristotle complained that the changeless Platonic Forms could not act as causes of anything, and he along with Alexander substituted deflationary accounts of universals, Alexander in some texts reducing them to mental constructs with a role of practically no significance at all. Would we not expect the Neoplatonist commentators to turn against Alexander's deflationary account? It is very surprising, then, to find that the Neoplatonist Porphyry, and Boethius expounding Porphyry,

seem content with a deflationary account of universals close to the one proposed by Alexander. What has happened to universals as Platonic Forms? The answer, I believe, is that the Neoplatonists have so emphasised the role of Forms as causes, a role which Aristotle said they could not play, that they are willing to backtrack on the other role of Forms as universals, Simplicius *in Cat.* 82,35-83,20, Proclus *in Parm.* 880,3-11. A Form is not after all something universal and common to all instances, for it is too far superior to them. If it is something common at all, it is common as a cause to all its effects, but not as a common feature. Thus Aristotle loses on the issue of whether Forms can be causes, but he wins on the issue of whether universals are Forms.

The Aristotelians suffer from a curious distortion of their account of individuals. When Porphyry writes his introduction to Aristotle, the *Isagoge,* he describes individuals as being unique bundles (*athroismata*) of distinctive qualities (*idiotêtes*). Why? – for Aristotle believes that the individual consists of matter and form. I conjecture that once again Plato's *Theaetetus* is the ultimate source, although the *athroisma* idea is in the same chapter of Alcinous, *Didaskalikos,* ch. 4. In the *Theaetetus,* the individual Theaetetus is described as consisting of qualities such as a distinctive snubness of nose. The terms 'bundle' (*athroisma*) and 'distinctive' (*idios*) occur earlier in the *Theaetetus* respectively at 157B-C and 154A, 166C. I think Porphyry offers this Platonic view of the individual, because his introduction is for beginners in Philosophy, and he does not yet want to broach the more complex concepts of matter and form, which enter into Aristotle's account of the individual. But because Porphyry wrote this in an introduction to Aristotle, later Neoplatonists, Proclus, Simplicius, and possibly 'Philoponus', though they are well aware of Aristotle's belief in matter and form, take it to be a view, if not of Aristotle, at any rate of the Aristotelian school. If so, the Aristotelians' account of individuals has been harmonised with Plato's, this time by a sort of accident of interpretation.

My first three examples have come from the field of psychology: concepts, perception and self-awareness, my next two from logic and metaphysics: universals and individuals. The next two examples will come from physics. Aristotle disagreed with Plato in postulating a fifth element as constituting the heavens, whereas Plato had been satisfied with one of the standard four elements, namely fire. The commentators offer almost opposite harmonisations, according to whether they are friendly or hostile to Aristotle. Proclus, the hostile one, tries to show, in the preface to his commentary on Plato's *Timaeus,* that Plato had already anticipated virtually everything that Aristotle had to say. So when Plato associated the shape of the heavens with the fifth of the five figures that had been shown to be the only possible regular convex solids in geometry, he was anticipating Aristotle's fifth element, *in Tim.* 1.6,29-7,2; 2.49,29-50,2. The explanation is repeated by Simplicius, *in Cael.* 12,16-27. But Simplicius knows a more friendly method of harmonisation, *in Cael.* 85,31-86,7. Aristotle recognised that the heavens were a particularly pure mixture of

the four elements with fire predominating. He spoke as if the result were a fifth element, only to emphasise its divinity in praiseworthy opposition to the sort of view more recently taken by the Christians. On both interpretations Aristotle's view is accommodated, but on the first he comes out an imitator, on the second a hero. Harmonisation is not a unitary procedure.

The same hostility is exhibited by Proclus, this time on better grounds, in connexion with God's responsibility for the world's existence. Aristotle's God is a thinker, not a creator, and he inspires motion in the universe, but does not provide existence, since the five elements exist independently of him. At best, as pointed out by Iamblichus' pupil Dexippus, the motion (by producing seasonal rainfall, etc.) gives form and life to some things. But Proclus complains that, on his own principles, Aristotle should have made God responsible for the existence of the universe. Proclus' pupil, Ammonius, effects the harmonisation, arguing at book length that this is what Aristotle intended his principles to show,[10] and Simplicius follows Ammonius. This is the tradition that enabled Thomas Aquinas to harmonise Aristotle's God with Christianity.

I should finish with the other harmonisation that was crucial for Christian acceptance of Aristotle – the issue of individual immortality. This time, even Plato's views caused some problem. Although he makes Socrates assure his friends in the *Phaedo* on the day of his execution that he personally will survive, there is room for worry that the rational soul, which is what Plato regards as the true self, is rather impersonal. On one interpretation, Plato's *First Alcibiades* even recognises this at 130D. The worry comes to a head when Plotinus discusses those disembodied human souls which have attained the ideal state of identifying themselves with Intellect, and whose thoughts have the same content – the Platonic Forms. What is there left to distinguish these souls from each other? Plotinus' analogy is with a theorem in a mathematical system. Each theorem is distinct, but cannot be understood as a theorem, except in terms of the whole system.

But if this preserves some individuality, why should Aristotle agree? He insists from the opening chapter of *On the Soul* that no mental activities, with the possible exception of thinking, can occur apart from a body The soul turns out to exist only as enforming a living body, so that, presumably, we perish when we die. The special case of thinking is discussed in Book 3, ch. 5. Here room is made for a productive intellect to be resident in us. But is this intellect part of us, or, as Alexander was to say, is it rather God resident in us, which offers no immortality to us? Themistius disagreed with Alexander, and made it part of the human soul. But even that leaves a question: is it a soul shared by the human race, as the followers of Averroes were later to say, or is it individual? In his controversy with the Averroists, Thomas Aquinas claimed support from Themistius, who allowed for individual intellects. What Averroes did was to apply to all of our intellect what Philoponus and 'Philoponus' conceded about part of our intellect, that its immortality is merely an unending succession of mortal intellects. (**Psychology 3(g)** and **Logic and Metaphysics 17(e)**). In this

example, Plato as well as Aristotle have to be subjected to careful reinterpretation, to get the desired result.

Let us draw some conclusions. Plato has been reinterpreted as well as Aristotle on perception, on concepts, on the fifth element, on individuals and, most radically, on universals. Only some attempted to harmonise Plato and Aristotle on concepts, and any harmonisation on individuals was an unrecognised accident. The forces in play have not only been harmonisation. There was also a misinterpretation arising from the reinterpretation of Porphyry's *Isagoge* as an authoritative source for Aristotelian views. And there was a response within Platonism to internal pressures concerning the role of Forms. The more important the causal role, the less defended was the role of Forms as universals. The effect of these changes on Medieval Philosophy was almost as important in the case of universals as in the case of the Creator God and the immortal human soul.

The commentators and Christianity

The Neoplatonists lived in a love-hate relationship with Christianity. Often they influenced it, for example, on the natures of Christ and the person of the Trinity. They shared many concerns: life and punishment after death, containers for the departed soul, continuity and individuality of the person, body-soul relations, prayer, prophecy, providence, evil, fate, chance, temptation, sin, pride and the Fall, forgiveness, freedom from emotion, demons and angels, sacrifice, suicide and martyrdom, nature and the supernatural, mystical experience of God, his ineffability, the creation of the universe, its beginning and end, the stars, time and eternity, timeless knowledge and causation, omniscience and omnipotence. They moved in the same world of ideas and the Sourcebook will make cross-references.

In his *Confessions* 7.9.14; 7.20.26, Augustine describes being converted to Christianity in 386 AD by 'books of the Platonists', which clearly include some works of Plotinus. Courcelle has claimed to trace to the day the Platonist ideas Augustine would have heard from the sermons of St Ambrose in Milan. Even later, in *City of God* Book 10, Augustine concedes that Porphyry has a dim awareness of the Christian Trinity, when he speaks of three gods, describing One and Intellect as God the Father and God the Son, and further recognising not merely Plotinus' third hypostasis, the Soul, but a triad of Being, Life and Intellect (*City of God* 10.23; 29, translated in **Logic and Metaphysics 14(c)**). Porphyry, Augustine says, also recognises the limitations of pagan theurgic ritual, regarding it as unnecessary and unhelpful to intellectuals like himself and even recognising the importance of God's grace, though Augustine complains that Porphyry exploits the utility of theurgy in recruiting the masses to pagan religion, *City of God* 10.9; 27; 29, translated in **Psychology 18(b)**. Grace, we shall find there, had also been recognised earlier by Plotinus, and was even more recognised in theurgy itself by Iamblichus and Proclus.

Porphyry is a striking case. His serious probing of Christianity in *Against the Christians*, parallel to his probing of Egyptian religion in his *Letter to Anebo*, was viewed as the most serious intellectual threat to Christianity and was twice subjected to burning. Yet his advocacy of the Chaldaean ideals of faith, truth, love and hope (*Letter to Marcella* 24, translated below), and his insistence that the true sacrifice is that of a pure mind (*Abstinence* 2.61, translated in **Psychology 18(a)**) fit very well with Christianity, even if not for the Christian reason that animal sacrifice is superseded by Christ's having made the final sacrifice. Moreover, Porphyry's non-spatial account of the relation between soul and body seems to have been applied by Augustine and other Christians not only to soul and body, but also to the natures of Christ and the persons of the Trinity.

We have seen that Porphyry's probable pupil, Iamblichus, made a powerful defence of pagan religious practice in the early fourth century. He replied with some contempt in *On the Mysteries of the Egyptians* to Porphyry's doubts, and provided a model to the later Emperor Julian for the revival of pagan religion.

In the fifth century, pagan Neoplatonists were severely persecuted by Christians in Alexandria, while in Athens Proclus stopped teaching for a year, to avoid persecution for impiety. We have seen that Damascius escaped from Alexandria, eventually to become head of the Neoplatonist school in Athens. Proclus and Damascius both complain, sometimes in coded terms, of the hegemony of Christianity, which they regard as deeply irreligious, and which they still hope is temporary. The complaints made against the Christian Philoponus by Simplicius after the Athenian closure of 529 have already been mentioned. He calls Philoponus 'the Grammarian' perhaps in allusion to his having a post other than the Philosophy Chair, but he also thinks of a grammarian as one who knows a text without putting it into practice (*Commentary on Epictetus*, ch. 62, lines 22-7 Hadot (with her comment p. 55) = Dübner 134,17-24). Philoponus, however, was attacked from both sides. He eventually became the intellectual leader of those Christians who believed that Christ had only one nature, not two natures, one human, one divine. But this doctrine was declared heretical, and Philoponus was also posthumously condemned for applying to the Christian Trinity Porphyry's conception of three gods, instead of three persons.

Other Christians at the end of the fifth and beginning of the sixth centuries also harnessed Neoplatonist views. Boethius' classic *Consolation of Philosophy* is so congenial to Platonist belief that Boethius has wrongly been thought not to be Christian. Pseudo-Dionysius, as much as Augustine before him, drew on Neoplatonism in ways that profoundly influenced Christian mystical thought. But his method was the very different one of plagiarising the theological ideas of Proclus to produce Christian documents purporting to come from St Paul's disciple Dionysius in the first century. The plagiarism worked, and there is a note, possibly written by Philoponus, claiming that it was Proclus who plagiarised Dionysius.

In Alexandria, by the time of Olympiodorus, pupils were predominantly Christian, and we see him telling them that they can think of Neoplatonist daemons as angels (*in Alc. 1* 21,15-18), and that he is as much a monotheist as they are (*in Gorg.* 32-3; 243-4, the latter passage translated in **Logic and Metaphysics 14(c)**). In fact, five *in Cat.* commentaries say that the purpose of reading Aristotle's philosophy is to know that there is only one supreme source, Ammonius 6,9-16; Philoponus 5,34-6,2; Olympiodorus 9,14-30; Simplicius 6,6-18; Elias 119,26-121,4. Elias, the Christian professor, argues against objections that this was Aristotle's view.

The pagan Neoplatonists, though postulating many gods, were not thereby violating the views of such Christians as Origen *Against Celsus* 5.4 and Augustine, who allowed the term 'god' to be applied to both angels and, in Augustine's case, humans. He explicitly agrees with Porphyry, in *City of God* 9.23, that this is only a verbal issue, provided, he adds, that the other gods owe their divine characteristics to the one God, as the Neoplatonists would agree. Olympiodorus issues an analogous *caveat*, that the other gods are used by the One Cause as intermediaries. Some Christians, Origen and Eusebius, were even ready to apply the term 'god' to persons of the Christian Trinity, and the Christian commentator Philoponus was to endorse that, even though his endorsement was condemned. Texts are translated in **Logic and Metaphysics 14(c)**.

I think it will throw light on the religious situation to consider what concession Ammonius had to make to the Christian authorities in order to keep the Alexandrian School of Neoplatonism open, and how much this concession affected the teaching.

There has been a mystery what agreement Ammonius struck with the Christian patriarch. Damascius in Athens expresses his disgust in his so-called *Life of Isidore* 250,2; 251,12-14, now put in its wider context as fr. 118B in Damascius' *Philosophical History* by Polymnia Athanassiadi:

> Ammonius, who was disgustingly mercenary and saw everything in terms of profit of any kind, made an agreement with the then bishop of the prevailing doctrine, Damascius *Philosophical History* 118B Athanassiadi (= *Life of Isidore* 251,12-14; tr. RRKS).

Three suggestions have run into counter-examples,[11] Praechter's of 1910 and 1912, that Ammonius agreed to continue a policy, alleged to be Alexandrian, of reducing the number of Neoplatonist gods to one by collapsing the One into the Intellect, Saffrey's of 1954 that he agreed to teach only Aristotle, not Plato and Westerink's of 1962 that he kept quiet about the pagan belief in the eternity and divinity of the world (references in Sorabji, ed. *Aristotle Transformed*, 12). I therefore suggested (loc. cit.) that the agreement was more likely to concern not theological doctrine directly, but refraining from the open promotion of pagan practice, which (as Athanassiadi has now shown, though her sympathies lie with Damascius and

against Ammonius, 30-2 of her *Damascius. The Philosophical History*) Damascius carried out in Athens, bravely, but incautiously.

Athanassiadi has added yet a further hypothesis, with which I have explained my disagreement elsewhere, that Ammonius' concession was to betray the hiding places of his fellow Neoplatonists in Alexandria during the persecution of the 480s, and that his reward was not literally financial.[12]

My own conjecture, that Ammonius' concession concerned first and foremost pagan religious practice, fits well with new evidence that Ammonius expresses a very different view of religion from that of his Athenian predecessors. What strikes me most is Ammonius' treatment of the efficacy in ritual of divine names properly chosen by a theurgist, and the evidence that this provides for the naturalness of certain names. Ammonius claims at the beginning of his commentary on Aristotle's *de Interpretatione* 1,6-11, that he is recording the interpretations of his teacher Proclus, although he hopes to add further clarification himself. It has been shown by Anne Sheppard how closely Ammonius' commentary follows Proclus' commentary on a different work, Plato' s *Cratylus*.[13] Yet when Ammonius comes to the present subject, he is silent about the argument from the efficacy of divine names in ritual, to which Proclus had devoted pages. This efficacy is not only endorsed by the *Chaldaean Oracles*, but used as a proof of the naturalness of divine names by Iamblichus *Myst.* 7.4, 255,5-256,3 Des Places, and by Proclus *in Crat.* 51-2; 57; 71 Pasquali, whose view is mentioned as one among others by Damascius *in Phileb.* 24 Westerink. According to Proclus, Iamblichus held that Theurgy imitates secret marks implanted in us by the gods, when it frames divine names, *in Crat.* 71, 31,24-32,5 Pasquali. Yet Ammonius is silent about all this. Instead he refers to the efficacy of *human* names in certain prayers and curses. And even to this he devotes only three lines, *in Int.* 38,23-6. Moreover, because the efficacy of human names was not the argument that appealed to the Neoplatonists, he is able to dissociate Neoplatonism entirely from the whole line of thought, and credit it instead to a philosophically irrelevant Egyptian priest, Dousareios of Petra. The Christian Origen, borrowing presumably from a Platonist source, had argued that the natural efficacy of *divine* names in ritual is even clearer evidence of their naturalness than the natural efficacy of *human* names, *Against Celsus* 5.45.[14] Iamblichus discounted the use of human names, at least in the case of love-spells, as depending merely on *human* artifice exploiting natural sympathy in the universe.

Why was Ammonius silent at this point on his predecessors' major argument for the naturalness of certain names? Robbert van den Berg has pointed out[15] that while Proclus offers a role in the giving of names (and not only of divine names) to the divine Craftsman (*in Crat.* 51, pp.19,22-20,21 Pasquali; *Plat. Theol.* 1.29, p. 124,12-20 Saffrey-Westerink), Ammonius denies (*in Int.* 38,26-8; *in Cat.* 11,8-17) any role to the gods in the giving of names. Names are, as Aristotle says, the result of human

agreements. In this, Ammonius follows Porphyry's view that names are 'imposed' by humans. But Aristotle is said still to agree with the Socrates of Plato's *Cratylus* that names are natural in one of the senses mentioned by Proclus *in Crat.* 7,18-8,14, for they are like artistic images which fit the natures of things, *in Int.* 34,17-37,18. Ammonius, unlike Proclus, supports Aristotle and harmonises him with Plato partly through taking a different view of the gods, a view in this case based on Porphyry. This different account of the gods need not be, as I once thought, the result of his agreement with the Christian authorities, but rather something which helped to facilitate that agreement.

There is another piece of evidence about Ammonius' treatment of religion. At the beginning of his commentary on Aristotle's *de Interpretatione*, 1,6-11, he has a punning one-line invocation of Hermes, god of eloquence and hermeneutics. Iamblichus had also invoked Hermes as god of eloquence at the beginning of his *On the Mysteries of the Egyptians*, but he does so in a religious spirit, to open a religious treatise, calling Hermes protector of the true science of the gods, accepted by all priests (1.4-2.3 Des Places). Even more devout are the prayers which the Athenian Simplicius includes in his commentaries. The prayer at the end of his *de Caelo* commentary, 731,25-9, has been studied for its fervour by Philippe Hoffmann,[16] who translates it as follows.

> These reflections O Lord, Creator of the whole universe and of the simple bodies within it, I offer to you as a hymn, to you and to the beings you have produced, I who have ardently desired to contemplate the greatness of your works and to reveal it to those who are worthy of it, so that, conceiving nothing mean or human about you, we may adore you in accordance with your transcendency in relation to all the things you have created.

By contrast Ammonius merely says that if he is able to add further clarification after recording the interpretations of Proclus, he will owe thanks to the god of eloquence. David Blank has pointed out, in his translation in the *Ancient Commentators* series, that there is probably a pun in acknowledging the god of hermeneutics in a commentary on Aristotle's treatise, whose Greek title, *Peri hermêneias,* also invokes hermeneutics.

If I am right that Ammonius' concession concerned religious practice, what did he gain in return? I conjecture that it was a salary to keep his prodigious teaching going. We know that his philosopher-father, Hermeias, had received maintenance from the state (*dêmosia sitêsis*), and that through the influence of his mother, this had exceptionally been extended to the young Ammonius and to his short-lived brother, until such time as they should become philosophers (Damascius *The Philosophical History* fr. 56 Athanassiadi). In other words, the Christian authorities, at least in an earlier generation in Alexandria, had actually invested in his becoming a

philosopher. Whether or not he was a member of the disliked School of Horapollo, they may well have thought that Ammonius was not, like Horapollo, going to start converting Christians. At least by the time of the disbandment of Horapollo's school, if not sooner, Ammonius will have needed money to continue teaching, and given the city's acceptance of his mother and investment in his playing that role, it may have seemed only natural to provide a teaching salary, on condition that the teaching did not emphasise pagan religious practice, as in Ammonius' case they might have been confident it would not.

Even if I am right that Ammonius' concession was, contrary to Praechter's view, primarily about religious practice, Praechter will still have been right to the extent that there were bound to be some implications for doctrinal content, but these implications will have been derivative. One implication would have been the need to avoid the argument from the efficacy of theurgically chosen divine names. But in addition, Ammonius' Alexandrians did not write theological treatises as Iamblichus and the Athenians did, such as the commentaries on the *Chaldaean Oracles*, Iamblichus' *On the Mysteries of the Egyptians*, Proclus' *Platonic Theology*, or Damascius' *On First Principles*. Praechter was wrong that they suppressed the One. Nor did they deliberately simplify Proclus' system of multiple gods and henads. But it is just as significant that they did not write the sort of treatises which would have told us what they thought about these gods and henads. Praechter was moreover right that they focused more on Aristotle and gave Aristotle more credit than Proclus had. Praechter pointed out that the Alexandrian, Olympiodorus, backs Aristotle against Plato on the definition of the category of relatives, *in Cat.* 112,19ff. I would also recall that whereas Proclus complains that Aristotle wrongly failed to make God responsible for the existence of the universe (*in Tim.* 1.266,28-268,24 Diehl), Ammonius wrote a whole book to show that this was precisely what Aristotle did do (so Simplicius *in Phys.* 1361,11-1363,12).

Although I do not believe that Ammonius was involved in betraying the hiding places of his fellow Neoplatonists in the 480s, was his concession a betrayal of the spirit of Neoplatonism? No: only of that spirit, *as it was construed* by the Athenians and other followers of Iamblichus. But Neoplatonism accommodated more than one strand. First, Ammonius did not, as Praechter supposed, suppress recognition of the supreme divinity, the One, above the Intellect. Secondly, Ammonius' next successor but one, Olympiodorus, feels absolutely free to say that Theurgy gives us union with the intelligibles. The context of his statement is very interesting. After discussing five levels of virtue, he gives a role to Theurgy alongside Philosophy. Interestingly, he does not explicitly follow Iamblichus' idea that there is a special level of supreme human virtue, the theurgic, which would imply that other humans are less virtuous than theurgists. But at the point where this might have been mentioned, he does allow that, while Philosophy makes us become intellect, Theurgy gives us union with the

intelligibles (*Commentary on Phaedo*, Lecture 8, para 2, lines 1-20 Westerink).

This places Olympiodorus somewhere in between the Athenian followers of Iamblichus on the one hand and Plotinus and Porphyry on the other. Plotinus does not speak of Theurgy. Porphyry, in *On the Return of the Soul*, held, according to Augustine, that Theurgy merely purifies the imagination and so helps us to see visions, but does *not* purify intellect, and so cannot lead us to God (Augustine *City of God* 10.9, *CCL* 47, lines 13-35). Porphyry *Against the Christians*, fr. 76 Harnack, denies it matters what names you give to the gods. It is Porphyry's idea of humans 'imposing' names that Ammonius follows. Iamblichus, Syrianus and Proclus, then, should not be seen as the mainstream in Neoplatonism, but only as one stream that went in a different direction. Even one of Iamblichus' pupils, Theodore of Asine, refused to follow Iamblichus' acceptance of the *Chaldaean Oracles*, and Damascius, though admiring of Iamblichus' theology, is very critical of Proclus. Once this variety is taken into account, we can see Ammonius as returning to a position somewhere in between that of the Athenians and that of Plotinus. He was not obliged to see himself as betraying Neoplatonism, but as returning to a middle position.

Now we must add in that Ammonius kept his school open for another century, while Damascius had his closed. There must be value in keeping one's school open, if it is not at the cost of betraying one's values.

In sum, I have claimed that there were differences between Ammonius' Alexandria and the Athenian followers of Iamblichus, but that they were primarily differences about the role of pagan religious practice in the teaching, with doctrinal differences as merely secondary.

Physics

The discussion of physics by the Aristotelian Alexander is agreed to be important, but concerning the later commentators A.C. Lloyd once declared that 'one would not expect to find Neoplatonists at their best or their most interesting' in physics, because they attached little importance to the physical world.[17] But, as Lloyd was later to emphasise, Porphyry made Aristotle's treatment of the physical world part of the standard Neoplatonist curriculum, and, I should add, before that, Plotinus' discussions are perceptive and fascinating. Many of the innovations boasted of by the commentator Simplicius, as recorded in **Logic and Metaphysics 2(c)**, concern the physics of space and time. His rival, Philoponus, was one of the most innovative physicists of antiquity. Nor is it as if modern physics has settled all the fundamental questions which the commentators were discussing.

Settled or not, we find here the following issues discussed among others. Is the world's history determined? Must the same circumstances have the same outcome? Does causation require events? Is the universe a bundle of ideas? Must space be infinite? Can time be infinite? Is there a limit to

smallness? Does time require change or consciousness? Can time be circular? Does history repeat itself exactly? Can one escape from time? Can it be established whether the universe had a beginning? Is the passage of time real? Can matter be seen, in its most fundamental form, as a field manifesting properties? Can bodies pass through each other? Is this how light behaves? Is vacuum possible – an absence of body? What is body? Can there be motion in a vacuum? What forces account for motion? How can there be evil in a providential world? Is God's knowledge or power restricted? If not, what about our freedom? Does nature operate mechanistically? Is it under divine control? Does it control everything? Is there a role for chance? Does this accommodate or oppose Providence – or freedom?

In introducing the commentators' treatment of Physics, I shall inevitably touch again on some of the themes already discussed, but I shall be putting them in the new context of what else was happening in Physics. Despite their huge differences, on some issues the Aristotelian, Alexander, and the Neoplatonists agree. The physical universe is finite in space, but infinite in time. They share the same Aristotelian conception of infinity, and agree on there being no smallest size for matter, even if flesh and other kinds of matter lose their distinctive characteristics below a minimum appropriate size. They resist arguments in favour of determinism, and accept that there is contingency, even though Plotinus inherits the view of the deterministic Stoics that determinism is compatible (**Psychology 14(a)**) with things being 'up to us'. Alexander, however, believes that nature works in a mechanistic way, even though it exhibits chance, contingency and (non-conscious) purpose. He attacks the Stoics' account of causation in terms of the same circumstances necessarily having the same outcome, and relatedly, attacks (**Logic and Metaphysics 6(h)**) their belief that history will repeat itself exactly an infinite number of times with the same people. He also rejects (**Psychology 6(a)**) the view of his rival, Galen, that the soul is just the blend of ingredients in the body, as well as Galen's views on motion and time.

The Neoplatonists, however, have their own agenda. They want the soul to be even more independent of the body than Alexander allows. They further believe that the physical world is created by causes that are both changeless and outside of time, in a world apprehensible only by the mind. The difficulty of such a conception encourages very innovative thinking, which some Christians were ready to apply to the causal powers of the Christian God. Despite the three or more different levels of divinity that the Neoplatonists recognised, they increasingly claimed to be monotheistic, as Christianity prevailed, and their God, unlike Alexander's, is a Creator God, eternally and beginninglessly creating the physical universe. Nature is not autonomous, as Alexander thinks, but reflects the influence of these divine forces. The Neoplatonist God, unlike Alexander's philosopher-God who is not concerned with such lowly matters, exercises Providence about everything in the physical world, and knows everything. But this divine

knowledge calls for Iamblichus' idea that his knowledge is above the status of what he knows; for example of the contingent he has knowledge that is definite, and of the temporal knowledge that is timeless. Given that the Providence of the Neoplatonist God is so much more extensive than that of Alexander's, it becomes a pressing problem for the Neoplatonists how there can be evil in a providential world. For the sixth century Christian, Boethius, who tried to provide a Latin version of these theories up to the time of his premature death by execution, the timelessness of God's knowledge protected our freedom, and the existence of chance, as conceived by Aristotle, made room for the exercise of divine Providence. The Neoplatonist aspiration is for humans to escape from time to the world that only the mind can apprehend, and the reality of the passage of time is put in doubt especially by Iamblichus. What kind of self must be ours for such escape to be possible is studied in **Logic and Metaphysics 17** and **18**.

The Christian bishop, Gregory of Nyssa, introduced the Berkeleian view that physical objects are bundles of God's ideas, as his answer to Porphyry's problem how an immaterial God can create a material world, if cause has to be like effect. The answer is that the world is not material in the way normally supposed. Porphyry may also have helped to inspire the style of argument found in Augustine, Avicenna and Descartes, according to which (**Psychology 4(f)**) our certainty about our own existence or essence and uncertainty about our bodies, shows that we or our soul are not by essence bodily.

Besides theoretical science, our texts reflect empirical science. Philoponus tells us, as mentioned above, of experiments with the speed of fall of different weights. Much earlier, in the century after Aristotle, the third century BC, Herophilus discovered the ovaries, and we find more appreciation than in Aristotle of the female's role in reproduction. Herophilus also, with Erasistratus, discovered the nerves, so that gradually the importance of the brain had to be acknowledged by everyone. Before AD 200, Galen is probing the brains of living monkeys to trace the motor system, and stitching them back up alive. On the optic nerve, well known to Galen and to some, but not all, commentators, see **Psychology 1(h)**.

Aristotle's astronomy, which was, like most (but not all) ancient Greek astronomy, geocentric, was questioned even by members of his own school. His immediate successors were Theophrastus and Strato, of whom the first raised the question whether God was needed to move the stars, and the second positively denied it. Another Aristotelian, Xenarchus, produced a devastating attack on the need for a special rotatory fifth element to explain the motion of the stars around the earth, and this attack was later developed by the Neoplatonist Proclus. In the second century AD, Ptolemy produced the most successful elaboration of the geocentric universe. Aristotle's system of celestial bodies wheeling round us on concentric transparent spheres was not able to account for the planets being closer to us at some times of year than at others. The new astronomy accommodated this through the idea of epicycles (circles upon circles), or eccentrics (circles

with moveable centres not coinciding with the earth's centre). Already by the end of Ptolemy's century, Alexander appears to have a simpler system than Aristotle's, with far fewer spheres, and by the time of Proclus, the celestial bodies seem mostly to be moving freely along pathways, rather than being physically embedded in spheres.

The philosophical treatment of Physics comes to a climax with the theories of the Christian Philoponus in the sixth century AD. As explained in the section on 'The commentators' above, he used the pagan Neoplatonism, in which he was steeped, to argue that the pagans, on their own principles, should accept the views of Christianity. To recapitulate briefly, the universe must have had an absolute beginning, because the pagans themselves deny that anything can finish going through an infinity of years, much less exceed an infinity. The problem of infinities that include infinities was not understood by the Greeks, unless a palimpsest of Archimedes, when deciphered, proves him to have had such knowledge. But Thabit ibn Qurra (died AD 901), who came from Harran to Baghdad, used one to one correspondence to prove that the natural numbers and the even numbers have the same infinity,[18] and it may have been through translations from Arabic that the English scholar Grosseteste in the thirteenth century was able to be clearer about the subject than his Greek predecessors in his treatise on light.

Philoponus also improved on the explanations of dynamics which the Neoplatonists had inherited from Aristotle, developing the idea, previously used only sporadically, of an impetus, or force impressed into a moving body from outside. Eventually, Philoponus sought to unify the fragmented Aristotelian dynamics by explaining nearly all motion as due to an impetus imposed by the Christian God at the time of Creation. He also refuted Aristotle's objection to the possibility of motion in a vacuum, that it would involve infinite speed. Philoponus further advocated the idea that in bodies the basic subject which carries physical properties should not be seen as the mysterious prime matter of the commentators on Aristotle, something which John Locke was later to call, under another name, a 'something, I know not what'. Rather it was something perfectly familiar, three-dimensional extension.

As a Christian, Philoponus did not succeed to the Chair which Ammonius had secured for the pagan Neoplatonists in Christian Alexandria, and when Christians did take over the Chair, later in the sixth century, they lacked the originality of a Philoponus, although they give us a lot of interesting ideas. It fell to the Islamic philosophers in the ninth century to appreciate the brilliance of Philoponus and that, along with Byzantium, was one of the two major routes by which the torch was passed on, starting in the late twelfth century, to the Latin-speaking Christian West.

Repeatedly, the commentators of AD 200 to 600 originate physical ideas (impetus in dynamics, the attack on an infinite past, the idea of latitude of forms), which have been wrongly supposed to originate in the thirteenth or fourteenth centuries of the Latin-speaking West. Galileo was more con-

scious of the antecedents of his dynamics in the work of Philoponus. Now that two lost portions of Alexander's physical commentaries have been found (from *in GC* and *in Phys.*) and translations are soon to be published, it will become clearer how far the Neoplatonist commentators were drawing on the Aristotelian Alexander.

Notes

1. H. Usener, *Göttingische gelehrte Anzeigen* 26, 1892, pp. 1001-22. K. Praechter, *Byzantinische Zeitschrift* 18, 1909, 516-38, translated into English in Richard Sorabji, ed., *Aristotle Transformed*, London & Ithaca, NY 1990, ch. 2.

2. Now in English: Olympiodorus *in Gorg.* (Jackson, Lycos, Tarrant); Calcidius *in Tim.* (partly in van Winden, den Boeft); Iamblichus fragments (Dillon); Proclus *in Crat.* in preparation (Duvick); Proclus *in Tim.* (Taylor); Proclus *in Tim.* forthcoming (Tarrant, Runia, Baltzly); Proclus *in Parm.* (Morrow, Dillon); Proclus *in Parm.* end of book 7 from Latin (Klibansky, Labowsky, Anscombe); Proclus *in Alcib. 1* (O'Neill); Olympiodorus and Damascius *in Phaed.* (Westerink); Damascius *in Phileb.* (Westerink); *Anonymous Prolegomena to Platonic Philosophy* (Westerink). See also extracts in Thomas Taylor, *The Works of Plato*, 5 vols (1804). French: Proclus *in Tim.* (Festugière); Proclus *in Remp.* (Festugière); Proclus *in Parm.* (Chaignet); Proclus *in Tim.* in preparation, new edition (Opsomer); Proclus *in Alcib. 1* (new edition by Segonds); *Anon. in Parm.* (Hadot); Damascius *in Parm.* (Chaignet, new edition by Westerink, Combès).

3. So H.J. Blumenthal, 'Plotinus in later Platonism', in H.J. Blumenthal and R.A. Markus, eds, *Neoplatonism and Early Christian Thought*, London 1981, 215; 217 and in 'Neoplatonic elements in the *de Anima* commentators', *Phronesis* 21, 1976, 64-87, repr. in Richard Sorabji, ed., *Aristotle Transformed*, London & Ithaca, NY 1990, see 312-13.

4. By John Sellars in Peter Adamson, Han Baltussen, Martin Stone, eds, *Philosophy, Science and Exegesis in Greek, Arabic and Latin Commentaries, Bulletin of the Institute of Classical Studies*, supp. vol. 2004, forthcoming.

5. Angelos Chaniotis, 'New inscriptions from Aphrodisias', *American Journal of Archaeology*, forthcoming.

6. *In Metaph.* 206,12-207,4 is cited by Arthur Madigan, 'Alexander on Aristotle's species and genera as principles', in Lawrence P. Schrenk, ed., *Aristotle in Late Antiquity*, Washington DC 1994, 76-91, and Alexander is elsewhere ready to complain of fallacy (*paragôgê*) in Aristotle.

7. Polymnia Athanassiadi, *Damascius. The Philosophical History*, Athens 1999.

8. Michel Tardieu, *Les paysages reliques: routes et haltes syriennes d'Isidore à Simplicius*, Leuven 1990.

Michel Tardieu, 'Sabiens coraniques et "sabiens" de Harran', *Journal Asiatique* 274, 1986, 1-44.

Michel Tardieu, 'Les calendriers en usage à Harran d'après les sources arabes et le commentaire de Simplicius à la Physique d'Aristote' in I. Hadot, ed., *Simplicius, sa vie, son œuvre, sa survie*, Berlin & New York 1987, 40-57.

I. Hadot, 'La vie et l'œuvre de Simplicius d'après des sources grecques et arabes' in I. Hadot, ed., op. cit., 3-39, in English in Richard Sorabji, ed., *Aristotle Transformed*, London & Ithaca, NY 1990.

I. Hadot, *Simplicius. Commentaire sur le Manuel d'Epictète*, Leiden 1996, ch. 2.

One part of Tardieu's evidence concerning calendars has been attacked, with reply in I. Hadot 1996, by Paul Foulkes, 'Where was Simplicius?', *Journal of*

Hellenic Studies 112, 1992, 143; S. van Riet, 'À propos de la biographie de Simplicius', *Revue Philosophique de Louvain* 89, 1991, 506-14. There is further disagreement in Concetta Luna, *Mnemosyne* 54, 2001, 482-504, reviewing a restatement of Tardieu's theory by R. Thiel.

Objections to the Arabic evidence, though still needing further assessment, are made by Joep Lameer, 'From Alexandria to Baghdad: reflections on the genesis of a problematical tradition', in G. Endress, R. Kruk, eds, *The Ancient Tradition in Christian and Islamic Hellenism*, CNWS publications, Leiden University, Leiden 1997, 181-91.

For the excavation of the possible school houses of Proclus and of Damascius in Athens, both abandoned by their pagan occupants, see Alison Frantz, 'Pagan philosophers in Christian Athens', *Proceedings of the American Philosophical Society* 119, 1975, 29-38; Polymnia Athanassiadi, *Damascius. The Philosophical History*, Athens 1999, Appendix I.

9. Carlos Steel, 'Plato Latinus (1939-1989)', in *Rencontres de cultures dans la philosophie médiévale: traductions et traducteurs de l'antiquité tardive du XIV^e^ siècle*, Louvain-la neuve, 1990, 301-16, contrasts the reception in Latin of Plato and of Aristotle.

10. See H.D. Saffrey, 'How did Syrianus regard Aristotle?', translated from the French of 1987, in R. Sorabji, ed., *Aristotle Transformed*, London & Ithaca, NY 1990; Carlos Steel, 'Why should we prefer Plato's *Timaeus* to Aristotle's *Physics*? Proclus' critique of Aristotle's causal explanation of the physical world', in Robert Sharples, Anne Sheppard, eds, *Ancient Approaches to Plato's Timaeus, Bulletin of the Institute of Classical Studies* suppl. vol. 78, London 2003.

11. For the following, see:

Karl Praechter, 'Richtungen und Schulen im Neuplatonismus', *Genethliakon für Carl Robert*, Berlin 1910, 'Christlich-neuplatonische Beziehungen', *Byzantinische Zeitschrift* 21, 1912.

H.D. Saffrey, 'Le Chrétien Jean Philopon et la survivance de l'école d'Alexandrie', in *Revue des Études Grecques* 67, 1954, 400-1.

L.G. Westerink, 'The Alexandrian commentators and the introductions to their commentaries', in Richard Sorabji, ed., *Aristotle Transformed*, London and Ithaca, NY 1990, ch. 14, 327, revised from *Anonymous Prolegomena to Platonic Philosophy*, Amsterdam 1962, Introd., xxxiiff.

A.C. Lloyd, 'The later Neoplatonists', in A.H. Armstrong, ed., *The Cambridge History of Later Greek and Early Medieval Philosophy*, Cambridge 1970, 316.

I. Hadot, *Le problème du néoplatonisme Alexandrin: Hiéroclès et Simplicius*, Paris 1978.

Koenraad Verrycken, 'The metaphysics of Ammonius son of Hermeias', in Richard Sorabji, ed., *Aristotle Transformed*, London & Ithaca, NY 1990, ch. 10.

Richard Sorabji, 'The ancient commentators on Aristotle', in Richard Sorabji, ed., *Aristotle Transformed*, London & Ithaca, NY 1990, ch. 1, 12.

12. Polymnia Athanassiadi, *Damascius, The Philosophical History*, 30-2; Richard Sorabji, 'Divine names and sordid deals in Ammonius' Alexandria', in Andrew Smith, ed., *Neoplatonism and Society*, Cardiff 2003.

13. Anne Sheppard, 'Proclus' philosophical method of exegesis: the use of Aristotle and the Stoics in the Commentary on the *Cratylus*', in J. Pépin, H.-D. Saffrey, eds, *Proclus, Lecteur et interprète des anciens*, Paris 1987, 137-51.

14. On Origen see John Dillon, 'The magical power of names in Origen and later Platonism', in R. Hanson, H. Crouzel, eds, *Origeniana Tertia*, Rome 1985, 203-16; J. Daniélou, 'Eunome l'Arien et l'exégèse neoplatonicienne du *Cratyle*', in *Revue des Études Grecques* 69, 1956, 412-32.

15. Robbert van den Berg, 'Smoothing over the differences: Proclus and Am-

monius on Plato's *Cratylus* and Aristotle's *De Interpretatione*', in Peter Adamson, Han Baltussen, Martin Stone, eds, *Philosophy, Science and Exegesis in Greek, Arabic and Latin Commentaries*, Institute of Classical Studies, suppl. vol., London 2004.

16. Philippe Hoffmann, 'Simplicius' polemics', in Richard Sorabji, ed., *Philoponus and the Rejection of Aristotelian Science*, London and Ithaca, NY 1987, ch. 3 at p. 72.

17. A.C. Lloyd, 'Introduction to later Neoplatonism', in A.H. Armstrong, ed., *The Cambridge History of Later Greek and Early Medieval Philosophy*, Cambridge 1970, ch. 17, 272-82 at 276.

18. I owe the information to Roshdi Rashed.

1. Nature

Nature (*phusis*) is the subject of Aristotle's *Physics*, and so is placed first.

1(a) Definition of nature

Aristotle in *Physics* 2.1, 192b13 distinguishes natural things from artefacts as having an internal source of change, including motion, and of rest, whereas artefacts have to be pushed, halted, or otherwise acted on from the outside. Alexander explains that though the rotating heavens never rest, they too count as natural. See also **22(a)**.

(1) Alexander *ap.* Simplicium *in Phys.* 264,18-22

Alexander notes: '[Aristotle's] words, "each of these has within itself a source of motion and rest" [*Phys.* 2.1, 192b13-14] refer to what he has mentioned before, that is to animals, plants and the elementary bodies, not to all natural things. For the body that rotates is also natural and has in itself a source of motion, but not of rest since it moves ceaselessly'. RRKS

1(b) The status of nature: self-sufficient mechanism, or dependent on higher powers?

The Neoplatonists, as Genequand has brought out, did not want to give nature too much independence, for fear of jeopardising the unifying power of higher intelligible realms. Aristotle and the Aristotelians did not feel the same concern. Alexander holds that nature acts without the need for Platonic Ideas as a model and without rational reflection or choice but by a sequence of automatic changes, *ap.* Simplicium *in Phys.* 310,25-311,21, like those of marionettes. Nonetheless, the natural sequences have a purpose, and in natural reproduction the parent's enmattered form serves as a model. Alexander's mechanistic (though teleological) account of nature contrasted with that of his rival Galen, and was opposed by the Neoplatonists, starting with Plotinus.

(1) Alexander *in Metaph.* 103,4-104,18

One might also prove that none of the things constituted by nature comes to be or has come to be by reference to a model by the following argument. If the world is eternal, and if none of the things that now come to be in accordance with nature comes to be by reference to an Idea as model, then neither would anything have come to be in this way in the past. But the world is indeed eternal as they say; and none of the things that now come to be in accordance with nature comes to be by reference to an Idea as

model, as I shall prove. Therefore, neither did any of the things that came to be naturally in the past come to be as [if] by reference to a model; for all things always come to be in the same way in the world, since it is eternal. But if this is so, the Ideas would not be models.

[103,12] But that none of the things that now come to be naturally comes to be by reference to an Idea [as] model is clear from the following. All the things that come to be are particular instances of particular things that exist, and are generated by a particular instance of particular things, so that things [generated] naturally also [come to be in this way]: this man, for instance, is naturally generated by this man, and this horse by this horse, and this vine by this vine. But surely each of the things too that produce something naturally does so in virtue of the nature in it, i.e. in virtue of the cause and principle and power in it to move in some way. For those things both exist naturally and have a nature that have a principle of movement within themselves inasmuch as they are also these particular things, but not *per accidens*; and the horse in fact produces the horse in virtue of this sort of principle in it. But certainly neither a man nor a horse nor any other of the things that generate and produce naturally produces the thing it generates while looking to a model; for it is not by giving any thought whatever to how the thing that is to be should come to be that they set about producing what they produce, as we see in the case of the arts. For it is for this reason that the arts are only in those capable of exercising this kind of foresight over the things that will be as a result of art, for they are in men; but many things are generated in accordance with nature both by irrational and even by inanimate things.

Therefore, none of the things that now produce something in accordance with nature does so by reference to a model; but if not now, not in the past either, for the generation of things that come into being naturally is always similar.

[103,31] There is both truth and falsity in saying that the things that come to be naturally do so according to certain numbers, determinate and arranged in a fixed order (*tetagmenos*) (for they do not come to be as a result of chance or spontaneity, for it is for this reason that a man generates a man), and in thinking on this account that nature produces its effects by reference to a kind of model or plan (*logos*) while looking to this latter. For all natural things come to be according to a certain order and certain determinate numbers, and not by chance or spontaneity, but surely this does not mean that they also come to be by reference to a model. For it is not by reflecting (*ennoein*) that nature produces what it does (for it is an irrational power), but it is responsible for the fact that [generation] takes place in an orderly progression of movements, so that a first movement is followed in orderly sequence by a second, although not as the result of any reasoning process, and this second movement is followed in turn by a third, until the movements have progressed to the end for the sake of which they occurred. It is this order that art imitates, for it puts things together in a rational way and [thus] produces its object. Hence art is a rational power,

but nature is irrational. But it is not correct to say that nature, being a kind of divine art, produces nothing irrationally, nor to think that, because it is divine, it possesses from the gods this gift of producing what it does [by looking] to some fixed and determinate model. For it is not in this way that nature is called a divine art, as if the gods were employing this art, but because, being a power from the gods, it is capable of preserving the right order of movement according to a certain harmonious sequence, not in virtue of any reasoning process of thought (*noêsis*), but because it is from the gods. But the gift it possesses from the gods could not be that of producing by reference to a model, for how could it produce anything by reference to a model of which it has no knowledge whatever?

[104,12] One might, however, more reasonably say that nature has from the gods this similarity to the [rational] agent, in whom the thing coming to be exists and from whom it takes its origin, that nature produces according to the regular order (*eutaxia*) of movements that is without reason. Again, it is possible to discover [this] regular order even in evil things and in those that come to be in a way contrary to nature, such as abscesses, wounds, boils, and periodic illnesses. But the generations of certain living things too are in fact orderly, but not by reference to an Idea, those e.g. of worms, gnats, and grubs. WED

(2) Alexander *ap.* Simplicium *in Phys.* 310,20-311,30

The second cause he defines as 'formal'. For inherent health is a cause of being healthy, and <inherent> commensurability is a cause of being commensurable. For form is not only the immediately apparent shape, but is also to do with the rational principle (*logos*). But when he calls the form a model, he is not suggesting that it is some ideal self-subsisting substance to which the things in this world bear a likeness, as do those who posit 'the Forms'.

[310,25] Alexander says: 'Things that are productive in nature do not first of all have a conception of what they are producing, and then produce it in such a way that one could say that according to Aristotle the conception is a model (*paradeigma*) of what is produced, as is the case with the arts; rather it is the form which is instantiated in matter which he calls a model because nature produces whatever it produces by aiming at this. This is clear from the fact that when it has been produced, nature ceases producing it, since the form is something defined and, as it were, a target (*skopos*) set up at which nature aims, which is the reason for its being called a model. But the end and the model', says Alexander, 'do not have the same significance in the case of everything that produces for the sake of something. On the one hand, in the case of things that produce according to choice, art and reason, the end must be that for the sake of which everything else comes-to-be; it must first be conceived in the mind of the producer and be set up as a target and model for what is to be; on the other hand, in the case of things that come-to-be by nature, this is not so. For

nature does not work by choice or by any reason within it, for nature', he says, 'is an irrational power. Rather the first principle is lodged in the matter which receives both it and what is to come into being because of and from it; that first principle, itself lodged, itself produced that defined entity of which it is itself productive, while what results from this is something different. For each of them [first principle and matter] is productive of, and causes change in, what comes after it – if nothing stops it. This process continues up to an end, the attainment of the natural form, of which the beginning was the principle lodged in the matter – just as in the case of marionettes; when the operator starts the movement in the first doll this becomes the cause of movement to the next, and this to the one after it, until the movement passes through them all – unless something prevents it – not according to any reason or choice in themselves when the one before moves the one after. In this way too the nature-cum-power is lodged together in the seed, and becoming present in the appropriate matter and having the ability to change it, does change it insofar as it is naturally constituted to make changes, and [matter is] to be changed. The power which is engendered from the first change produces in its turn a second change, and keeps its force until it has produced something like that from which it started when it was lodged in matter, and something the same either in species or in genus, as is the case with animals, such as mules, that are produced by dissimilar begetters but which are the same in genus as their begetters. This progression proceeds according to stages and regularity until what is coming-to-be is perfected according to the form, if nothing prevents it. This does not happen according to any reason or choice in the agents of change and production, as has been said.

[311,21] But nature does not, on account of this not being the case, produce at random and not for the sake of something. 'For the sake of something' is not the term applied [only] to coming-to-be based on reason and choice, but everything that comes-to-be according to some regularity and because of something else does so for the sake of something. This is the case whether there is choice and reason or whether there is no reason, as we say is the case with nature. For even if natural things are, through material necessities, accompanied by what does not have reference to anything (as is said to be the case with hair in the arm-pits, unless even this does have some use), one should not represent nature for this reason as not acting for the sake of something. The form, then, is a model in that nature has nodded in its direction not through choice, but more like a marionette. BF

Contrast Alexander's rival Galen *On the Use of Parts*. Nature displays skill, forethought and providence.

(3) Galen *On the Use of Parts* 17 Helmreich 2,442,25-443,8

For someone, then, who correctly examines the works of nature, it is

sufficient to take a look just at an arm, before it is dissected. But someone who is, as I have put it, an enemy of nature, even if they observe the art inside the hand, which I have set out in the first two discourses, will lose sleep trying to find a way of insulting any of the things that they have seen. In the same way, anyone who correctly examines also with respect to the legs both the measure of their size and the use of each of their movements, will not only praise, but also be amazed by, the art of nature. HL

(4) Galen *On the Use of Parts* 17 Helmreich 2,439,12-440,3

When an elephant had died and I dissected the passages that extend from the apertures up to the root of the part, I found their ending to be twofold – similar to the passages in humans – one running up to the brain, the other open to the mouth; and I was even more amazed about the art of nature. When I found out in addition that as the animal travels through a deep river or lake, so that its whole body is submerged, it extends its trunk upwards and breathes through it – then I understood nature to have providence not only in finely providing all parts of the animal, but also in teaching the animal their use, as I have shown at the beginning of the whole study. HL

(5) Galen *On the Use of Parts* 17 Helmreich 2,449,8-14

Indeed the wisdom and power of the art which created the flea seems to be of such greatness as effortlessly to preserve it, make it grow and nourish it. When, then, the creator's art is seen to be of such greatness in the case of any chance animal, in what one might conjecture to be incidental work, how great must one consider his wisdom and power as displayed in creatures of significance? HL

(6) Galen *On the Use of Parts* 17 Helmreich 2,450,26-451,9

The third use of the present study, in addition to those that have been mentioned, is in relation to the sophists – those, that is, who do not concede to us that crises in diseases occur by nature, and who deny nature's providence for animals. For in raising problems as to the uses of parts, which they do not know themselves, as if they did not exist, they seem to do away with the art of nature. Moreover, they laugh at Hippocrates when he recommends imitating the things that nature is accustomed to do in crises. HL

Plotinus' reply:

(7) Plotinus 3.8 [30] 2 (3-15)

But levering must also be removed from nature's creative action. For what

kind of pushing and what leverage makes varied colours and all kinds of shapes? Even the wax-moulders, at whom people looked and thought that the craftsmanship of nature was like that, cannot make colours unless they bring them from elsewhere into what they are making. But they should have recognised that even in the case of those who pursue such crafts, there must be something unmoving within them in the light of whose immobility they are going to make their products with their hands, and they should have gone up to a principle of that sort in nature and understood that there too the power which does not act with hands must be unmoving, and unmoving in entirety. RRKS

Simplicius replies to Alexander, *in Phys.* 314,9-24, that nature is the instrument of the intelligible world. He criticises Alexander's idea that shoot, stalk and ear produce each other (312,18-313,1). Granted, the nature of the father, and indeed of the mother, play a role in reproduction and that Alexander's comparison with automatic marionettes is applicable (313,1-27). But the nature in the seed is not yet developed (313,1-5) and the reproductive process is not a conscious one (313,27-314,6). Hence, it depends on consciousness at the level of higher causes. Simplicius pins his remarks to Aristotle's description at *Phys.* 2.3, 195b26 of immanent form as a paradigm. Simplicius wants to give a role to paradigms at a higher level.

(8) Simplicius *in Phys.* 312,18-314,15

Furthermore, what was said about the coming-to-be of natural things seems to me to deserve close examination. For if what was initially sown itself produced that of which it was itself productive, and if what was produced from it produced something different, and if each can produce and change what comes after until the attainment of the end and the natural form derived from what was initially sown in the matter, then – if the process of coming-to-be reached its conclusion in this way – first, if the grain produced the shoot, and the shoot produced the stalk, and the stalk produced the ear, how could it be the case that the less complete produced the more complete? For the shoot is less complete than the stalk, and the stalk less complete than the ear. Next, we cannot say what the cause of the whole is. If the form is single, then there needs to be a single cause prior to those of the parts.

[312,28] In general if the subsequent products come-to-be when there is an alteration in the earlier ones, the former products would be material rather than productive. For the productive cause never becomes the completed product by being altered. Furthermore, if things are not randomly produced, but only from what has the [appropriate] potential, it is clear that the shoot is the stalk in potential. Everything that exists in potential is material, not productive, so that the shoot could reasonably be called the matter of the stalk, but in no way its productive [or efficient] cause.

[312,34] Next, everything that comes-to-be in actuality from what exists in potentiality is brought to actuality by an actuality. If, then, the shoot is not the stalk in actuality, it could not produce the stalk in actuality.

[313,1] In general if the nature of each thing, being a source and cause of change, is productive of its own substrate and no other, then it is clear that the nature of the seed will produce the seed, and the nature of the man will produce the man. How, then, could the nature which is in the seed but which is not yet the nature of the man properly produce a man before the man comes-to-be?

[313,5] The answer, as I said before, is that as soon as it itself comes-to-be, it begins to produce, because it is naturally better so and because it is a sort of life awakening and rising up to the form, since the seed of the male and [see next section] of the female have as their nature the alteration of the seed which finds its natural completion in the animal. The cause which is properly and immediately productive in the case of animals is the maternal [see **1(c)**] and the paternal nature, and in the case of plants it is the nature of the grain and of the earth; the form pre-exists in actuality in the father, the mother [see **1(c)**] and in the rational principles subsisting in actuality in the earth, according to which the potential is brought to actuality. If the nature of what comes-to-be is said to be productive in this way, it would be in this way that it is productive – in the sense that it itself comes-to-be. But what is productive in the proper sense is the nature of anything that exists in actuality. For nature is the begetter of its like, for the sake of which it anticipates all the stages in between, even if the nature which is coming to completion and being is altered in the process of producing, although it maintains a thread of continuity until the end, until it attains that end and ceases its production.

[313,19] Even Aristotle says that what exists by nature is whatever moves continuously from some source within itself and arrives at some end in which the movement ceases. So that in man the rational principle of the parent has been taken forward, and it is according to that that what comes-to-be is produced; the father provides the beginning and the movement right up to the completion by means of the seed (just as in the case of the marionettes the operator provides the beginning of the movement and the impulse towards its completion), according to the rational principle, pre-existing within him, of the whole ordered process of change, while the maternal nature is more immediately productive of the form.

[313,27] In what sense, then, does he [Aristotle] say that nature is an irrational power although it acts for the sake of some end, proceeds in an ordered way according to stages and determined measures? The answer is that the productive rational principle is twofold, one producing in a cognisant manner, which the interpreter [Alexander] sees as reason alone, the other without cognition and turning to itself (*eis heauto epistrophê*), but still producing in an ordered and determinate manner for the sake of some prior end. Just as the noncognisant is irrational as compared to cognisant reason, so that which produces in a random and disorderly manner is irrational as compared to that which produces in an ordered and determined manner for the sake of something. Therefore just as what comes-to-be by nature does so according to a rational principle of this

nature, so it does so according to a model which is not established as something known by the producer, but because the producer makes the product like itself by being, not by choosing, just as the signet-ring makes the impression.

[313,38] Aristotle himself in the second book of *On Coming-to-be and Passing Away*, alluding to Empedocles, agrees that nature is a rational principle. But in what way is there an order and a determinate end in the production without knowledge in the producer? For in fact natural things have the sort of existence that allows them, without any knowledge, to preserve, merely by being, the order and the thread of consistency in the process of their production and to reach a determined end, just as is the case with the movement of marionettes.

[314,6] But unless such natural things were the product of chance – which is absurd – either such things gave themselves existence, or they came into being from something different. Whatever the case, such existence occurred through being entirely known; for that which calculated its power against the product produced it, by knowing both. Therefore it is sensible to say rather that nature is co-responsible, and that the proximate causes of things that come-to-be and pass away are the movements of the heavens, according to which things on this earth are modified; and that higher up are the psychic principles of the movements, and even higher than these are the intelligible forms, from which in the first instance the shining forth of the forms is produced in all things according to the suitability of the recipients. BF

Alexander concedes that natural events are the effect of celestial motions and nature is a divine power, because derived from the heavenly bodies which are divine.

The talk in Alexander(?) *Quaest.* 2.3, 49,29-50,7 of nature as a divine power which gives form has been cited as possibly influencing the Islamic description of God as 'Giver of forms'. But a closer parallel is given in **20** below from Philoponus *in GC* 169,7-8; *in Phys.* 98,35-99.1.

For the possible influence of Alexander's divine power on the Neoplatonist idea of procession see **6(b)**.

(9) Alexander *On Fate* 169,20-6

For what is fated is in accordance with nature and what is in accordance with nature is fated. For it is not the case that man comes to be from man, and horse from horse, in accordance with nature, but not in accordance with Fate; rather, these causes accompany each other as if differing only in name. It is for this reason, too, that people say that the first causes of the coming-to-be of each thing in accordance with nature (that is, the celestial bodies and their orderly revolution) are also causes of Fate. For the beginning of all coming-to-be is the celestial bodies', in their motion, being in one type of position or another in relation to things on earth. RWS

(10) Alexander(?) *Mantissa* 172,17-23

Of the things that are brought about and put together by the divine power that comes to be in that body [the sublunary world] that is coming to be, as a result of its proximity to the divine [the heavens] – and this power we also call 'nature' – the most honourable is a human being. For he alone of things here [on earth] has a share in the most perfect of the powers of soul, and this is mind, and he alone has rational soul, as a result of which he is able to deliberate and enquire about the things he should do, and is not like the other living creatures; these, in virtue of their not sharing in such a power, we call 'irrational'. RWS

(11) Alexander(?) *Quaest.* 2.3, 47,30-48,1

What is the power that comes to be, from the movement of the divine body [the heavens], for the body [the sublunary world] adjacent to it which is mortal and subject to coming-to-be? Is this some nature other than the proper [nature] of each of the natural bodies, which we say is a principle of motion and of rest for that to which it belongs primarily in itself and not accidentally? RWS

(12) Alexander(?) *Quaest.* 2.3, 49,29-50,7

Or rather: One could say that the power from the divine [i.e. the celestial bodies] is the cause of the <difference> between the simple bodies [i.e. the four sublunary elements, earth, air, fire and water] and of their coming-to-be, itself coming to be their form and nature. For matter which is in itself without quality or shape is and comes to be body in actuality, is given form and shaped, by the power which comes to be [in] it from the divine bodies; the [part] of it [i.e. fire] which is near the divine body and adjacent to it has a greater share in the divine power and is given form by heat and dryness, for these are the first of the qualities [derived] from [the divine bodies] in mortal things; that which is more removed from the divine bodies, which are the causes of this change and coming-to-be for it, is either altogether given form by the opposites [i.e. by cold and fluidity, the properties of water] of these, or else acquires one of these [i.e. cold, fluidity] and one of the forms and qualities [i.e. heat, dryness] that are opposite to these, being given form in different ways according to the different relation of [the divine bodies] to things here [on earth] at different times which results from [their] movement on a circle of this sort. RWS

(13) Alexander *in Meteor. 4* 7,9-14

[The sublunary elements'] efficient cause and the [cause] in the sense of the source of the movement is the eternal movement of the divine [i.e. celestial] bodies and the power that comes to be in these [sublunary] bodies

as a result of their proximity to those [celestial ones]; and this one might reasonably name 'nature'. For this power is the cause of all the things that are believed to come to be by nature and in accordance with nature. RWS

(14) Alexander *Prov.* 77,12-79,9, from the Arabic

For the divine power, which we also call nature, arranges the things it is in and shapes them with a certain proportion and order, but without thinking about these things as it does so. For nature does not [give order] to any of the things it makes insofar as it thinks about it, or considers it with thought – since nature is an irrational power – but instead [it does so insofar as it] takes its existence from the divine living being [*haywân*] and body, which is the producer of its principle. For because its existence is from this body, and there is something [else] that proceeds and is sent forth from it [from nature], its commensurateness is in relation to this body. So its character is to be the agent cause of all motion that has order, and therefore its act occurs with determinate numbers and proportion. PA

But the Stoics are wrong; nature, not God, makes gnats:

(15) Alexander *Mixt.* 226,24-30

Surely it demeans our preconception of the deity to say that God pervades the whole of the matter underlying everything and remains in it, whatever it may be like, and has as his premeditated task the perpetual generation and moulding of anything that can come to be from it; and for them to make God a craftsman of grubs and gnats, simply devoting himself like modeller to clay, and making everything that can be created from it? RBT

Themistius offers some impressive arguments for the Platonists and against the Aristotelians. Aristotle is wrong to suppose that the individual parent sufficiently explains reproduction without appeal to Platonic Forms. Nature contains forms which come from a higher cause, the soul in the earth, which even Aristotle [Themistius alleges] derives from the ecliptic and Plato from the lesser gods.

(16) Themistius *in Metaph. 12* in Averroes *in Metaph. 12* Bouyges III 1492-4, translated from the Arabic

Themistius says: this argument [Aristotle *Metaph.* 12.3,1070a27: 'It is clear that we have no need whatever, at least on these grounds, [to accept] the existence of Forms: for a man begets a man which is an individual man'] would be sufficient as a refutation of the Forms, if its author [Aristotle] had not overlooked the many animals which are not born from their likes, in spite of their great number; for we see that a kind of hornet is born from the bodies of dead horses, bees from the bodies of dead cows, frogs from putrescence when it becomes sour. We see that nature does not generate these things from their likes in form and we are convinced that there are in

the sperm and the seed of each kind of animals and plants proportions proper to it by which are begotten these animals and plants which are begotten from it specifically and not from another, so that a horse is not begotten from the sperm of a man, nor a man from the sperm of a horse, nor a plant from the seed of another plant. Where are the models of these proportions in that from which these animals are born if they have not been formed previously in nature as proportions prepared and ready to produce any possible species of animal and made suitable for the production from it of some animals?

He [Themistius] says: do not be deceived by contempt for such animals, but reflect that we have more admiration for the skill of an artisan who makes something from clay than for what he makes from gold and ivory; if you examine carefully what happens with animals bigger than that, you will find that nature proceeds exactly in the same way. There is no doubt that proportions and forms have previously been put into nature and that it produces what it produces according to them. Although man is only begotten from man, the father exerts no craftsmanship in his composition of this, which cannot be in another state better than the state he is in. He comes to be in this state only because of the proportions and forms which have been put into the nature of each of the substances, not by reason of any craftsmanship on the part of the father, but as a result of the proportions. The body has no action upon a body, except only on its surface, but nature works on the whole frame of the body, and no wonder if nature does not understand the movement of its work towards a definite end, since it does not know and does not think about its work. This shows that these proportions are somehow inspired by a cause nobler, worthier, and higher in rank than themselves, i.e. the soul in the earth which Plato thought had been produced by the secondary gods and Aristotle by the sun and the ecliptic. Therefore, its activity is guided towards the end although it does not understand it, just as inspired people talk and foretell the future without understanding themselves what they say. In short, there are assuredly in nature proportions and forms since the generation of something requires something similar and not everything that is begotten has a like from which it is begotten. But when we need any form, we act in such a way that we know that this form cannot be produced by this act alone; this form, then, is produced as if it had been latent in something else, and it was indeed latent in the begetting nature. CG

Philoponus' *On the Creation of the World*, a late work supporting the Christian view of Creation, argues that God is ultimately responsible for all movement.

(17) Philoponus *Opif.* 28,20-29,9, translated under **22(f)**

Reading

Charles Genequand, 'Quelques aspects de l'idée de nature d'Aristote à al-Ghazâlî', *Revue de Théologie et de Philosophie* 116, 1984, 105-29.

Charles Genequand, *Alexander of Aphrodisias, On the Cosmos*, Leiden 2001, Introduction.

Devin Henry, 'Themistius and spontaneous generation in Aristotle's *Metaphysics*', *Oxford Studies in Ancient Philosophy* 24, 2003, 183-207.

1(c) Maternal nature

Aristotle had been forced by similarities of individual offspring to mothers to modify his view that only the father supplies form. Subsequently Herophilus discovered the ovaries and in the Aristotelian school Strato gave a role to female seed, as discussed by Galen *On Seed* 2.1; 2.5. Hence Simplicius *in Phys.* 313,5-27, translated in **1(b)** above, like Plotinus 5.7 [18] 2 (8-12), goes beyond Aristotle in openly acknowledging the mother's role, and even making her more responsible than the father for the child's form, since the father only starts things off. Aristotle does talk of the female *sperma*, but he means no more than the foetus.

Reading

David Balme, 'Aristotle's biology was not essentialist', repr. from *Archiv. für Geschichte der Philosophie*, 1980, with new appendices, in A. Gotthelf, J.G. Lennox, eds, *Philosophical Issues in Aristotle's Biology*, Cambridge 1987, app. 1, at 305-6.

Andrew Coles, *Matter, Life and Organization*, PhD diss., London 1992.

Sophia M. Connell, 'Aristotle and Galen on sex difference and reproduction: a new approach to an ancient rivalry', *Studies in the History and Philosophy of Science*, part A 31 (3), 2000, 405-27.

Anthony Preus, 'Galen's criticism of Aristotle's conception theory', *Journal of the History of Biology* 10, 1977, 65-85.

Heinrich von Staden, *Herophilus: The Art of Medicine in Early Alexandria*, Cambridge 1989.

1(d) Relation of nature to soul

Empedocles (on some ancient interpretations of frs 103, 110, 117) and Plato (*Timaeus* 77A-C) had granted soul to plants, but on the supposition, rejected by Aristotle, that they could feel. Aristotle retained the idea of soul in plants, but only by extending soul to cover all life-manifesting capacities, including the vegetative functions. It was the inanimate elements, earth, air, fire and water that exemplified nature without soul. Aristotle had no objection to thinking of soul as one kind of nature, one kind, that is, of inner source of change. The Stoics, followed by Galen, disagreed. They *replaced* soul in plants and embryos by *nature*. This led philosophers to think harder about how, in ensouled things, nature relates to soul. When Descartes declared that he would reject the view of the ancients that soul includes vegetative as well as conscious functions (Reply to objections brought against the 2nd *Meditation* §4 in the 5th *Objections* translated by Haldane and Ross, *Descartes, Philosophical Works* vol. 2, 210), he did not realise that the Stoics and Galen had done this before him. His decision to mark his restriction to conscious functions by substituting the word 'mind' (*mens*) for 'soul' (*anima*) has, however, had great influence on us.

On passage (2), cf. Clement *Strom.* 2.20 (*SVF* 2.714); Hierocles 1.5-33; 4.38-53 (*LS* 53B).

(i) The Stoics and Galen

(1) Galen *PHP* 6.3.7 = *SVF* 2.710

But the Stoics do not call what governs plants soul at all, but nature ... RRKS

(2) Galen *On the Natural Faculties* 1.1.1-2

Since perceiving and moving by choice (*kata proairesin*) are unique to animals, while growing and being nourished are common to plants as well, the former are works of the soul, the latter of nature. If, however, someone would give a share of soul to plants as well – dividing it and calling this soul vegetative and the other perceptual – he is saying nothing different, though his language is a bit unusual. For our part, we are convinced that the greatest virtue of language is clarity and we know that nothing destroys this as much as unusual terms. We use terms in the way that is customary to most people and we say that animals are governed by both a soul and a nature together, and plants by a nature alone, and we say that growing and being nourished are works of nature, not of soul. JH

Reading
Richard Sorabji, *Animal Minds and Human Morals*, London & Ithaca, NY 1993, ch. 8.

But Alexander and Nemesius apply to the Stoics a broader conception of nature according to which animal motion through desire (Stoic impulse) of the soul is natural.

(3) Alexander *On Fate* 182,4-8 = LS 62G

And as it is in the case of inanimate things, so it is also, they say, in that of living creatures. For there is a certain movement that is in accordance with nature for living creatures too, and this is movement in accordance with impulse (*hormê*); for every living creature that moves *qua* living creature is moved in a movement according to impulse brought about by fate through the creature. RWS

(4) Nemesius *Nature of Man* 35, 106,6-10 Morani

In that way non-rational and inanimate things will be found to have things *up to them*. For if they [the Stoics] assign desire (*hormê*) to us because we have it by nature, what stops us saying that burning is up to fire, since fire burns by its nature, as perhaps Philopator [a Stoic] seems to hint in his book on fate? JOU

(ii) Plotinus: nature is a weak version of soul which contemplates higher entities

(5) Plotinus 3.8 [30] 3 (1-23)

So how could [the forming principle in nature] have anything to do with contemplation (*theôria*) if it produces, and produces in this way?

The answer is that if it produces while enduring – that is to say while enduring within itself as a forming principle – it would itself be contemplation. For production could clearly only take place according to a forming principle if it were distinct from that forming principle, and the forming principle, in so much as it accompanies and oversees the production, would not be the act of production. So if it is not the act of production but a forming principle, it will be contemplation. The last phase of every forming principle is the result of contemplation and is contemplation in so far as it is the object of contemplation. But all that comes before that phase comprises either soul to the exclusion of Nature, or what is in Nature and is Nature.

[10] Is this itself derived from contemplation as well?

Yes, it is entirely derived from contemplation.

[11] Is it self-contemplating, then?

How else? For it is the outcome (*apotelesma*) of contemplation, that is to say of something contemplating.

[12] But how can Nature have contemplation? It certainly does not have the contemplation which comes from reason, by which I mean the rational consideration of its own contents.

Why not? It is a sort of life, a forming principle, a productive power.

[15] Is it because to consider is not yet to possess?

But it does possess, and because it possesses it also produces. So production comprises its being just what it is, and in so far as it is this, it is that which produces. It is both contemplation and an object of contemplation, since it is a forming principle. By being contemplation, an object of contemplation and a forming principle it produces, in that it is these three things. So its production has been revealed to us as contemplation. For it is the outcome of contemplation which is enduringly contemplation, engaging in no other pursuit, but producing by being contemplation. BF

(6) Plotinus 3.8 [30] 4 (1-31)

If somebody were to ask Nature why it produces, and if it were prepared to listen to the questioner and reply, it would say: 'You should not ask, but understand in silence, just as it is my practice to remain silent without speaking. What then are you to understand? That whatever comes into being is the object of my vision, itself an act of silence; it is an object of contemplation which comes naturally into being; I am nature and I am derived from such contemplation; it is part of me to possess a vision-loving nature. The contemplative in me produces an object of contemplation, just

as geometricians inscribe their figures as they contemplate. I do not inscribe, but I contemplate, and the outlines of corporeal beings emerge as if they fell from my contemplation. I share the experience of my mother and my begetters. For they too are derived from contemplation. My birth took place with no production on their part; they are higher forming principles which contemplate themselves – so I was born.'

[15] What does this mean?

It means that so-called Nature is soul, the child of a higher soul with a more powerful life; being at peace it possesses within itself a contemplation which is directed neither above nor below; it remains stable where it is, and in its stability and so to speak self-awareness (*sunaisthêsis*) it saw what was posterior to itself through this consciousness and self-awareness, as far as it was able, and having gained a glorious and delightful vision it ceased its search.

[22] If one wishes to ascribe any consciousness and perception to it, it is not the consciousness and perception that we speak of in the case of other beings, but it is as if we were likening the consciousness and perception of sleeping to those of wakefulness. For Nature is asleep, enjoying a contemplation of itself which comes to it because it endures in and with itself and is itself an object of contemplation; its contemplation is noiseless and somewhat dim, while there is another which is clearer to vision than it, of which it is an image. In this way whatever it begets is altogether weak, since weak contemplation produces a weak object of contemplation. For when men too show weakness in contemplation the actions they perform are mere shadows of contemplation and reason. Because their faculty of contemplation is inadequate through weakness of the soul, they are unable to embrace the vision adequately, and consequently lack fulfilment, although they desire to see. They are swept into activity in their desire to see what they are unable to achieve by intellect. So when they act, they themselves wish to see the result of their actions, and they want others too to view and perceive it, whenever the result matches the intention as best it can.

[39] On every occasion we shall find that action and production are a weakening or a consequence of contemplation – a weakening of it if one has no object beyond the completion of the action, and a consequence if one has something nobler than this to contemplate. For if one can contemplate the reality, why would one pursue for preference the counterfeit? Even duller children bear witness to this; having little aptitude for theoretical study they have recourse to practical activities. BF

Interpretations of Aristotle:

(iii) Alexander: below the heavens, there are two kinds of natural movement

– that of e.g. rocks, which is due to a natural downward inclination, and that of animate things, which is due to soul. Rocks also need an external cause of motion

to trigger the inclination (*Refutation of Galen*). Animals have both kinds of nature, the animate kind being soul (*On the Principles of the Universe* = *On the Cosmos*). In another passage, Alexander merely compares soul with natural heaviness, and claims that neither is moved *per se*.

(7) Alexander *Refutation of Galen's attack on 'everything that moves is moved by something'* 67a (Carullah ms 1279) translated from Arabic, p.17 Rescher-Marmura, Islamabad 1969

Then he set down that of the things that move naturally some possess the source of motion within them – this being the group of the things possessing souls because the soul within them is their source of motion inasmuch as these are possessors of souls – while some have their cause of motion outside them. Then he showed that natural bodies and those in [the process of] generation are of this order, that is, that all bodies moving naturally are moved by something. This he made clear in the case of the things having souls [holding] that they are moved by the soul: the mover that moves them is the soul; insofar as they have souls, they are moved by the motion of [another] thing. By these two [types of natural motion] he linked the meaning of both soul and body. He likewise made clear in the case of the bodies that move naturally through the inclination within them that their source of motion is from the inclination existing in them by virtue of which they move naturally. For the thing that moves them from heaviness in potency to heaviness in actuality, making them be in a state differing from that they were in, is also the cause of their motion in actuality. R-M

(8) Alexander *On the Principles of the Universe* (= *On the Cosmos* 17-19 Genequand)

[17] [Speaking of the heaven] It necessarily moves with this motion through soul and intellect because this soul is from the beginning the form of this body, and one must not believe that its nature is something different from its soul. [18] Likewise one must not believe that the nature of animals and composite bodies, insofar as they are animals, is something different from the soul; but insofar as these things are composite, they have a natural motion corresponding to the bodies that are not ensouled, other than the motion with which they are moved by the soul, but which is unique and in accordance with the prevailing <element> in the body composed of the other bodies. For each one of them has a certain natural motion before they become mixed with one another in a way that makes the whole ensouled. [19] As for the divine body, since it is simple – because it could not be eternal if it were composite – and its motion is also one and simple, it does not have any nature at all other than the soul, nor any natural motion other than the motion caused by the soul. CG

(iv) Alexander: in the heavens, soul is nature

Simplicius disagrees. Alexander's view is already clear from *On the Principles of the Universe* 17-19, just cited.

(9) Alexander *ap.* Simplicium *in Cael.* 380,29-381,2

'But we,' says Alexander, 'endeavour to show that the nature and the soul of the divine [i.e. heavenly] body are not different, but are like the heaviness of earth and the lightness of fire. For as, when we say that these are moved by nature, we are saying that they are moved in accordance with these powers, and the movement that is in accordance with their own powers is not some other movement they have besides that which is in accordance with nature; just so it evidently stood to reason that the soul should be both the nature and the power of the divine body; for what other nature could body have besides this? For soul is more perfect than nature, and it stands to reason that the more perfect body should also have a more perfect nature; and it is in accordance with this nature and soul that it moves in a circle.' RRKS

(10) Simplicius *in Cael.* 387,12-19, reporting Alexander

And so, if anyone investigates how nature causes the heaven to move and how the soul causes motion, it is wrong to answer with Alexander that in that case nature and soul (*psukhê*) are the same thing. How could they be the same if nature is a passive power of being moved [*Phys.* 8.4, 255b30-1], which is found in the subject that is moved [*Phys.* 2.1, 192b13; 22], while the soul is external to it (*exôthen*, Plato *Timaeus* 34B4; 36E3, more fully explained in **1(d)(v)**)? Therefore we must not say that soul and nature are identical in the case of the heaven, and that it undergoes the same motion in virtue of both of them. Rather [we should say that it undergoes motion] in virtue of the soul as an external cause of motion, and in virtue of nature as an internal origin of being moved. RMcK

(11) Alexander *ap.* Simplicium *in Phys.* 1219,1-7

For [Alexander] thinks that the soul and nature of the heaven are the same. At least he writes the following in his commentary on the second book of *On the Heavens*: 'We attempt to prove that the nature of the divine body does not differ from its soul, but is like the heaviness of earth and the lightness of fire.' And a little later, 'For what else besides this is the nature of it? For the soul is nature more completely. It is reasonable that the nature of a more complete body is also more complete.' JE

Theophrastus is like Alexander insofar as he had considered it possible that desire in the heavens might be natural (*sumphuton*), *Metaphysics* 6a10.

(v) *Per contra* Simplicius: nature and soul are distinct in living things, including the living heavens

They are distinct because, unlike soul, nature is, as Aristotle says (*Phys.* 8.4, 255b30-1), a source for being passively changed, 287,4-25. In addition, 286,36-287,4, soul is not like nature (*Phys.* 2.1, 192b13; 22) resident in what it moves, because its relation to body is non-spatial, on a view applied to rational soul by Plotinus 4.3 [27] 22 (1-9); Porphyry *Summikta Zetemata ap.* Nemesium 38,20-43,16 Morani; *Sentences* 3; 27; 31; and Proclus *in Tim.*, all translated in **Psychology 6.** In fact, Plotinus says (loc. cit.) it is better to think of body as being in soul, just as we can think of air as being in the light, rather than vice versa, and he refers to Plato *Timaeus* 34B4; 36E3, where Plato has the Demiurge fit the World's Soul to its body from the outside (*exôthen*). Simplicius takes this idea up at *in Cael.* 387,12-19, translated just above. The nature of the heavens is internal, their soul external. Even the four sublunary elements have their internal natures activated by the souls of the external agents who release them or bring bits of them into being (cf. *Phys.* 225b24-256a3). Simplicius' concession at *in Phys.* 287,20, that nature is a kind of life, does not allow that it is soul, especially as it is said to be the lowest kind of life.

(12) Simplicius *in Phys.* 286,20-287,25

But the soul too is a principle of movement and change in ensouled bodies according to both Plato and Aristotle himself. What, then, is the distinction? For it has been stated previously and should now be reiterated that even the lowest part of the soul, called the vegetative, is something other than nature even according to Aristotle – even if they often call the vegetative part of the soul nature on the grounds that it is close to nature. All soul, even the lowest kind, is said by him to be 'the first actuality of the natural body possessing organs' [*On the Soul* 2.1, 412b5-6], so that the vegetative part of the soul belongs to the body which has a nature, and so is something clearly different from its nature. But it is not only bodies with organs that have a nature, but also homoeomerous substances and the four elements. Furthermore, we give the name 'ensouled' to things that have within themselves the cause of growth, increase and the propagation of their kind, while we designate as 'natural' also things which are not like this, such as rocks, other minerals, lifeless bodies and simple bodies. Furthermore, all body has a nature (including the materials of artefacts like the material of the statue) and is natural just like the wood of the bed. But not all body is ensouled. Therefore nature would not be soul. It is clear that nature is inferior to the vegetative soul, since such soul supervenes on natural body as form on matter.

[286,36] How then did Aristotle present the difference between it and soul? I think that the phrase [concerning nature, *Phys.* 2.1, 192b22] 'in which it resides' is sufficient in this respect, and the following clearer phrase 'in a substrate' refers to nature. For all soul, because it properly has the power of moving, is set apart (*exaireisthai*) from what is moved.

[287,4] If this does not satisfy those who consider that the vegetative and irrational parts of the soul reside in bodies as substrates, then at any rate

the following will satisfy them, since it is most decisive both for the understanding of the natural substance and for the distinction between it and the soul. Aristotle does not say that nature is a source for change for bodies in the same sense that both he and Plato say that the soul is. For according to both, the soul is what moves bodies, but nature is not a source of movement in respect of moving but of being moved, and of cessation of movement not in respect of stopping but being stopped. That is why natural things are not said to be moved by themselves. For if, says Aristotle, they could move themselves, then they could also stop themselves. Nature seems to be a sort of propensity for being moved and regulated, as it were growing upwards from below and because of its own fitness inviting regulative causes. For if it were a principle of movement in the sense of causing movement, it would not in this respect differ from the soul and the primary moving cause. But since bodies are far removed from the indivisible and unextended essence and the life that subsists in absolute being, and are lifeless and spiritless in themselves, too chilled for any kind of life, they have within themselves the most distant sort of form of life (*eskhaton ti zôês eidos*) which relates to potentiality and propensity, that which we call nature, because of which even lifeless bodies can be moved and changed, and what is more grow and act on the passive in each other. For their activities are not pure, but involve being acted on. That is why all natural bodies can only move other things if they themselves are moved. Yet what is strictly unmoved itself [God] causes to move, as Aristotle says. BF

(13) Simplicius *in Cael.* 387,12-19, translated above

(14) Cf. Simplicius *in Phys.* 262,13-263,11; 379,28-9

Plato thinks, according to Philoponus, that the heavens are moved not by nature, but only by soul. The soul can move animals in directions other than the natural.

(15) Philoponus *contra Proclum* 479,16-20

Plato means that the heaven is moved with a circular motion like an animal, in the sense that its motion takes place not by nature but by soul. For all animals, the motion that is caused in them by soul is not in accordance with nature. AM

(16) Cf. Philoponus *contra Proclum* 488,2-8

Philoponus, Simplicius and, on Alexander's interpretation, Aristotle, think that the heavens can be moved by both nature and soul and in the same direction.

(17) Philoponus *contra Aristotelem* fr. 49 (= Simplicius *in Cael.* 79,8-14); fr. 50 (= Simplicius *in Cael.* 199,27-35)

Then, having made the above accusations in these [arguments], he [Philoponus] says that it is not impossible for the same movement to be caused by a soul and by nature at the same time.

'For example, if one imagined', he says, 'one of the birds making a straight flight towards the centre; the impulse of the soul thus coincides with the natural inclination (*phusikê rhopê*) of the body.'

He [Philoponus] thinks that Aristotle does not allow this in the passage [*Cael.* 2.1, 284a27-35], and he rejects the exegesis of Alexander which states this.

But since he [Philoponus] added an [argument] of the following kind too, that if the celestial body moves with a circular locomotion not by nature but by the agency of a soul (*hupo psukhês*), as is the case in living beings, or by the agency of some other superior force (*hupo allês tinos huperteras dunameôs*), it is not possible to infer from its motion either that heaven is generated or that it is ungenerated – and he invokes Aristotle as witness who says in the eighth book of the *Physics* [cf. ch. 10] that the heavens are moved by a superior cause (*ex huperteras aitias*) – he evidently does not understand that the same motion can be accomplished by different causes and that in one way the heavens *qua* natural body are moved in a circle by nature, in another way *qua* animate being (*hôs empsukhon*) by soul, and again *qua* intelligent being (*hôs ennoun*) by mind. CW

Simplicius thinks that nature, soul and intellect affect celestial motion in different ways.

(18) Simplicius *in Cael.* 382,9-19

If someone asks which local motion of the heaven comes from nature and which from soul, we say that soul, through the mediation of nature, makes the heaven move in a circle, and that it is one and the same motion. But it has from nature the connatural and unforced disposition, according to its very form, for being moved; while from soul it has the actuality of the motion toward which it was disposed by nature [i.e. circular rather than linear motion]. So, too, it has from Intellect its turning always and in the same way and according to the same [direction] and about the same [centre] and in the same [place] [this is an expansion of *Timaeus* 34A]. For by these things, under the leadership of Intellect, the psychic motion which is impressed through nature in bodies is constituted, and stabilised in the likeness of the activity of Intellect. Whence also that divine man, having asked why the heaven moves in a circle, says that it is because it imitates Intellect [the reference is to the opening sentences of Plotinus 2.2, *On the Motion of the Heaven*, which in turn are explicating *Timaeus* 34A]. SM

Reading

Stephen Menn, 'Descartes and some predecessors on the divine conservation of motion', *Synthèse* 83, 1990, 215-38.

Shlomo Pines, 'Omne quod movetur necesse est ab aliquo moveri: a refutation of Galen by Alexander of Aphrodisias and the theory of motion', *Isis* 52, 1961, 21-54.

(vi) Philoponus: nature is not in general soul, but the non-rational soul in animals may be their nature

(19) Philoponus *in Phys.* 195,24-7

So in what way do natural things differ from those that are not natural? [They differ] because natural things clearly have in themselves the source of their own movement and rest. For animals when they move are not moved by something outside but have the mover in themselves, and so do inanimate things. ARL

(20) Philoponus *in Phys.* 197,2-5; 13-22

So that even if the soul, both the rational and the irrational, moves [the animal], and this moving cause is in the moved, yet since it does not move [it] primarily, that is proximately, for this reason soul is not nature.

But perhaps it is possible to say that soul too is nature [in the case] of animals so far as they are animals. For if soul is the cause of the movement of animals *qua* animals primarily and not per accidens [Aristotle *Phys.* 2.1, 192b22], and is in them, and not only inanimate things are natural but also animals and animate things *tout court*, then this too seems to be nature, unless we are to say that animate things qua animate are not natural; [I mean] not the rational soul but all the rest, for this it is which proximately moves natural things. And perhaps it is possible that it was because of this [i.e. the rest of the soul] that he said 'primarily' [*Phys.* 2.1, 192b22], for thought too moves [by] being in the moved, but not primarily, but [it is] in the rational soul. ARL

(21) Philoponus *in Phys.* 198,6-8

So it is clear from this too that the definition will also embrace the nature of the animate, which is the soul; for the life of animate things is nothing other than soul. ARL

(vii) Does rational soul fall under nature?

If the science of nature discusses enmattered forms which are not separable from matter, how can it discuss the rational soul, which Neoplatonists regard as separable?

Asclepius: it can still study rational, mortal animal.

(22) Asclepius *in Metaph.* 361,1-3; 413,31-4

The study of nature deals with enmattered forms that are entirely inseparable from matter and with those which are viewed as subject to change. ...

And [Aristotle] says that the form is twofold, enmattered and immaterial, e.g. in the case of humans, immaterial form is the soul, while enmattered form is the rational, mortal animal. PL

Philoponus: the study of soul, despite their difference, at least contributes to the study of nature.

(23) Philoponus *in DA* 25,20-9

[After 'knowledge of the soul contributes (*sumballesthai*)', 402a5-6, Aristotle] added 'especially to the study of nature', because what contributes is different from that to which it contributes. In the ethical work and in theology the study of the soul is not a contributor, but rather a study arising directly from the subject proposed.... But in the work on nature, it is a contributor, for nature is one thing and the soul another. RRKS

'Simplicius': The study of soul belongs to more than one discipline.

(24) 'Simplicius' *in DA* 3,4-6

And that is why the study of the soul is neither simply physical, nor metaphysical, but belongs to both. PL

Reading

Peter Lautner, 'Status and method of psychology according to the late Neoplatonists and their influence during the sixteenth century', in Cees Leijenhorst, Christoph Luthy, eds, *The Dynamics of Aristotelian Natural Philosophy from Antiquity to the Seventeenth Century*, Leiden 2002.

1(e) Relation of nature to providence and to fate

Because the Stoics made providence and fate prominent, it became necessary to clarify their relation to nature. See under **4(d)** and **5(g)**.

1(f) Supernatural

Sections **1(f)**-**1(i)** record various ways of conforming or not conforming to nature and ideas about how anomalies were to be classified. Aristotle himself describes the virtues as acquired neither by nature nor contrary to nature, *EN* 2.1, 1103a23-6, but this is because acquisition requires habituation, not because there is anything supernatural about the virtues.

The first Christian and pagan occurrences of the idea of supernatural concern resurrection (Origen) and theurgy (Iamblichus replying to Porphyry). Origen's use is reminiscent of Plato *Timaeus* 41A -B on God's overriding the world's tendency to disintegrate, but Plato does not call that supernatural.

(1) Origen *Against Celsus* 5.23

So then we do not claim that the body which has been corrupted will return to the nature [it had] originally, any more than the seed of corn will return into [the state of] being a 'seed of corn' [cf. 1. Cor. 15,37]. For we say that just as in the case of the seed of corn an ear of corn arises, so also there is a rational principle (*logos*) inherent in the body, from which, without its perishing, the body is 'raised in incorruption' [cf. 1. Cor. 15,42]. On the other hand, the Stoics say that the body, having been entirely corrupted, will return to the nature (*phusis*) it had at the beginning, on account of the doctrines held by them concerning the people in the cosmic cycles, each of whom is indistinguishable (*aparallaktos*) [from someone in a previous cycle]; they say that the original bodily constitution (*sustasis*) from which bodies were dissolved will itself be reconstituted, establishing these things (so they think) by dialectical necessity. And in fact we do not take refuge in a most unreasonable position of retreat, claiming that 'everything is possible for God' [cf. Matt. 19,26]. For we know how to understand the 'everything' neither in the case of unreal things, nor in the case of inconceivable things. And we hold that God cannot do what is shameful, or God would be able not to be God. For if God does something unworthy, he is not God.

[line 18] And when he [i.e. Celsus] posits that 'God does not will (*boulesthai*) what is contrary to nature' (*para phusin*), we draw a distinction in what is said, in that if someone says that evil is contrary to nature, we too will affirm that God does not will what is contrary to nature, neither what is from evil nor what comes about irrationally. But if the things which come about in accordance with the *logos* of God and the divine will are in question, necessarily indeed these are not contrary to nature; <for> the things which are done by God are not contrary to nature, even if they are contrary to expectation (*paradoxa*) or seem to be so to some people. And if we must use forced terminology, we will say that in comparison to nature as commonly conceived, there are some things which are above nature (*huper tên phusin*), which at times God could effect, [such as] raising up man above mere human nature and causing him to change into a higher and more divine nature, sustaining him in this condition so long as the one who is sustained confirms by his actions that he wills this. DGR

(2) Iamblichus *Myst.* 9.1, 273,2-12

To put the matter simply, one may take two approaches to the personal daemon, the one theurgic, the other technical; following the former procedure, one summons the daemon down from the higher causal principles, while according to the latter, one resorts to the visible cycles of the generated realm; the former makes no use of horoscopes and suchlike, while the latter makes use also of such procedures; the former operates on a more universal basis, above nature (*huper tên phusin*), while the latter conducts its worship on an individual level, following the dictates of nature.

All this being the case, you seem to me to be proceeding inappropriately in dragging down the more perfect type of worship to the merely human level, and exercising your prowess in raising difficulties on that. JD

See also under **22(e)** and **22(f)** for supernatural motion in the cosmos.

Reading
Henri de Lubac, *Surnaturel*, Paris 1946.

1(g) Having a nature, in accordance with nature, by nature

Compare with the following Simplicius passage, Themistius *in Phys.* 37,2-10.

(1) Simplicius *in Phys.* 270,35-271,22

Having said that the things that have a nature are like this, he adds [Aristotle *Phys.* 2.1, 192b32ff.] further conclusions concerning what 'the things that are according to nature' are, saying that they cover a wider field than the things that have a nature. For in fact the things that have a nature are said to be according to nature as being characterised by the nature within them and as being just what they are said to be. But it is not only these things that are said to be according to nature, but also 'anything that belongs to them *per se*'. Fire has a nature by having within itself a source and cause of upward movement, and upward movement belongs to fire by nature and according to nature. But it cannot be said that to rise upwards 'has a nature', nor is this a nature. Nor is it even a substance, but a power and an activity belonging to fire according to the description of its nature; in this way it is said to be according to nature, and the same characteristic is said to be by nature, since [fire] has such a power and such an activity because of its own nature and because it is naturally like this.

To rise upwards belongs, then, to fire both by nature and according to nature. But 'by nature' is not the same as 'according to nature', since the former term has a wider application than the latter. We say that the term 'according to nature' belongs to those of the things that exist by nature which have their appropriate completion. There are certain things that exist by nature because they have come into being according to the activity of nature but which are not, however, according to nature; for example, things that are defective from birth and in general anything suffering a privation. For such things are like this because nature has made them like this, and the privation is a lack of something in what nature has made. So the phrase 'by nature' would be applied to everything that is in conformity and in keeping with the natural substance as such; for example, colour and sickness belong to the body by nature. But the term 'according to nature' can be applied only to that which occurs according to the will (*boulêma*) of nature. So we say that being healthy is according to nature, while illness is present by nature, since it is contrary to nature. So when Aristotle says that what exists by nature also exists according to nature he does not mean

that these two terms are synonymous, but that it is in the case of fire that rising upwards belongs to it by nature and according to nature. BF

1(h) Nature as a whole vs. parts

The Stoics, Proclus and Philoponus allow that what is contrary to a particular or specific nature may be in accordance with nature as a whole.

(1) Chrysippus in Plutarch, *St. Rep.* 1050C-D

Chrysippus grants a blatant licence to vice when he treats it as not only having been created by necessity or according to fate, but even as in accordance with God's reason and with the best nature. This is stated literally – for everyone to see – in the following words: 'Since universal nature extends to all things throughout, it must be the case that anything that somehow happens in the whole universe or in any of its parts, happens according to universal nature and its reason in due and unhindered sequence. For neither is there anything from the outside which could interfere with its organisation nor could any of its parts be susceptible of entering any process or assuming any state except in conformity with universal nature.' What then are the states and processes of the parts? Clearly such vices and diseases as lust for money, pleasure and fame, or cowardice and injustice are states; and acts of adultery, thefts, betrayals, homicides and parricides are processes. Chrysippus thinks that none of these, great or small, are contrary to the reason, law, justice or providence of Zeus. By consequence, breaking the law would not be contrary to the law, committing injustice would not be contrary to justice, doing evil would not be contrary to Providence. JO

(2) Philoponus *in Phys.* 201,10-202,12

But perhaps even these are not absolutely against nature, but in respect of [their] particular nature [they are] not by nature but against nature, while in respect of universal nature [they are] both by nature and according to nature. For the particular nature pursues one form and avoids one privation, but nature as a whole both pursues every form and avoids every privation. For this reason, in respect of the nature of man the monster is neither by nature nor according to nature; but in respect of the whole of nature, since nothing in the universe is against nature (for there is no evil in the universe), it is not against nature but by nature and according to nature – for even these things [(monsters)] arise because nature as a whole alters the underlying matter and makes it unsuitable for receiving the form of the particular nature. I mean something like this: suppose the surrounding atmosphere, mixed in such and such a way by the rotation of the heavenly [spheres], did something to the matter of a man in the process of generation so that he became unfitted to receive the form which nature would naturally impose upon him: then human nature would fail of its aim

through the unsuitability of the matter, but another form would arise, which would be against nature in respect of the particular nature, but according to nature and by nature as regards the whole of nature – for nothing therein is against nature, since not even destruction is against nature, at any rate if generation is according to nature; and since generation *is* according to nature, destruction too will of necessity be according to nature, assuming the generation of one thing is the destruction of another. I will take an example from which it will be clear to us what happens in the case of things arising against nature. Suppose there is a lyre-player who has tuned his lyre according to one of the scales, and suppose he then strikes up a tune, but someone outside tunes up some or all of the strings, or rather (to keep closer to our example) that the strings are retuned by suffering from dampness or dryness in the atmosphere; then suppose that the lyre-player moves the strings with his fingers in such a way that he would produce an artistic melody if the strings were tuned according to the proper principle (*logos*).

[202,1] So as in this case the lyre-player strikes the lyre in the natural way, but the underlying matter of the strings produces not the melody which the lyre-player intended but some inartistic, unorganised and indeterminate noise, so it happens in the case of nature as well. For the underlying matter becomes unsuitable for the human form or that of any other animal, because of the rotation and combining together of the heavenly [spheres], and so it happens that the actuality clothing it because of nature becomes distorted. And as we say that the noise arising from the untuned instrument [played] by the lyre-player did not arise by art nor even according to art (even though it arose because of an artist), so in the case of nature we say [the monster] did not arise by nature, since it was not even born in accordance with the determinate recipe (*logos*) of nature; yet with regard to the nature of the universe we say [the monster] arose by nature, because [it is] according to nature in the universe [that nature] destroys some things in generating others. ARL

(3) Proclus *On the Existence of Evils* 27,11-17 Boese

For nature as a whole, nothing is contrary to nature, since all rational principles derive from it. But for particularised nature, one thing is in accordance and another not in accordance with nature. Indeed, for each (particular) nature something else will be contrary to its nature. Thus for the nature of man the form of a lion here originates contrary to its nature, since neither the rational principle of this form nor that of other species is intrinsic to it, but only the rational principle of man. To this nature the rational principle of others are strange, and likewise in the case of all other things whose rational principles are specifically different. CS, JO

Cf. under **4(e)** for Proclus *On the Existence of Evils* 60,1-6.

1(i) Failure and abnormalities in nature, spontaneous generation, monstrosities, immoralities, sickness

Cf. the concept of evil as parasitic (*parupostasis*) under **4(e)**.

Some examples are classed as occurring by nature, but not in accordance with nature. See **1(g)** for the following passage:

(1) Simplicius *in Phys.* 271,12-14 with Themistius *in Phys.* 37,9

Other examples are classed as conforming to nature as a whole, rather than to particular natures, for which see **1(h)**.

1(j) Nature as purposive

See above, **1(b)**, Simplicius on Alexander *in Phys.* 311,21, and below, **4(a)(iv)**.

1(k) Nature as admitting exceptions

That Aristotle thinks nature admits of exceptions causes acute difficulty for his view that natural science can be formulated in syllogisms consisting of exceptionless generalisations. Although Aristotle and Alexander accordingly allow that the premisses of syllogisms in natural science may tell us what holds only for the most part, it proves impossibly difficult to obtain valid syllogisms that way. See **Logic and Metaphysics 8(d)** and the *Reading* there.

For examples of exceptions in nature, see **1(g)**, **1(h)** and **5(g)**.

Reading

P. Accattino, 'Alessandro di Afrodisia e la transmissione della forma nella riproduzione animale', *Atti dell'Academia delle Scienze di Torino* 122, 1988, 79-94.

Hilary Armstrong, 'Neoplatonic evaluations of nature, body, intellect', *Augustinian Studies* 3, 1972, 35-59.

L. Benakis, 'Die aristotelischen Begriffe Physis, Materie, Form, nach Michael Psellos', *Arch. Gesch. Philos.* 44, 1962, 33-61.

L. Benakis, 'Kritik an Aristoteles und seine eigene Lehre zur "Physis"- und "Materie-Form"-Problematik', *Byz. Zeitschr.* 56, 1963, 213-27.

M. Bernard, 'La critique de la notion de nature', *Studia Islamica* 51, 1980, 59-105.

P.L. Donini, '*Theia dunamis* in Alessandro di Afrodisia', in F. Romano and L. Cardullo, eds, *Dunamis nel neoplatonismo: atti del 2 colloquio internazionale del centro di ricerca sul neoplatonismo*, Florence 1996, 12-29.

Charles Genequand, 'Quelques aspects de l'idée de nature d'Aristote à al-Ghazâlî', *Revue de Théologie et de Philosophie* 116, 1984, 105-29.

Pierre Hadot, 'Rémarques sur la notion de physis et de nature', in Mélanges en hommage à Pierre Aubenque, *Herméneutique et Ontologie* éd. R. Brague, J.-F. Courtine, Paris 1990.

R.F. Hassing and E.M. Macierowski, 'John Philoponus on Aristotle's definition of nature', *Ancient Philosophy* 8, 1988, 73-100.

Giulio A. Lucchetta. *La natura e la sfera*, Bari 1987.

J. McGuire, 'Philoponus on *Physics* III 1, *phusis*, *dunamis* and the motion of simple bodies', *Ancient Philosophy* 5, 1985, 241-67.

Gérard Nadaff. *L'origine et l'évolution du concept grec de phusis*, Edwin Mellen Press, Lampeter 1992 (down to Plato).

S. Sambursky, *The Physical World of Late Antiquity*, London 1962, 93-8.
R.W. Sharples, 'On body, soul and generation in Alexander of Aphrodisias', *Apeiron* 27, 1994, 163-70.
Richard Sorabji, *Matter, Space and Motion*, London & Ithaca, NY 1988, chs 13-14.
R. Specht, 'Die Vorstellung von der Ohnmacht der Natur, Ghazali to Descartes', in S.M. Stern, A. Hourani, V. Brown, eds, *Islamic Philosophy and the Classical Tradition. Essays presented to R. Walzer*, Oxford 1972.

2. Change

Change is central to Aristotle's *Physics*, because nature is defined as an inner source of change. For comments on Aristotle's causal principle that the action of agent and patient are, in a sense, identical and located in the patient, see under **6(g)**.

2(a) Change vs. activity (*energeia*), as incomplete

Aristotle sometimes contrasts change (*kinêsis*) with activity (*energeia*) by saying that a change, like building a house, has to wait until the end in order to be complete, whereas an activity, like thinking, is complete at any stage, *EN* 1174a14-23; cf. *Metaph.* 9.6. This is reflected grammatically in the point that, when someone is building a house, we cannot say until the end, 'he has built the house'. But as soon as someone is thinking, we can say, 'he has thought'. Ackrill has argued that this is the central criterion for the distinction.

Reading

J.L. Ackrill, 'Aristotle's distinction between *energeia* and *kinêsis*', in R. Bambrough, ed., *New Essays on Plato and Aristotle*, London 1965, repr. in Ackrill, *Essays on Plato and Aristotle*, Oxford 1997, ch. 9, 142-62.

Ackrill has pointed out that Aristotle's criterion concerning incompleteness ought to classify walking a mile and hearing a symphony as *kinêseis*, not complete until the end, whereas engaging in walking or in listening to music, being complete at any stage, should be *energeiai*. Thus in effect Aristotle has succeeded in distinguishing *descriptions* of what is going on, rather than, as he intended, types of thing going on. Nonetheless, such a distinction could in fact have been very useful, say, to a Stoic philosopher who recommends living every hour as if your last, and pinning no hopes on the future. This attitude requires you to be concerned with certain descriptions of what you are doing, with 'composing music' rather than with 'composing a symphony', since the latter may never get completed.

Plotinus 6.1 [42] 16 wants a very different account of change as not contrasted with *energeia*, but a species of it. Moreover, he wants change to be a timeless relation among timeless intelligible entities. To achieve this result, he here seizes on Aristotle's failure to see that it is not walking, but walking a certain distance that is incomplete.

Plotinus also exploits some of Aristotle's remarks about instantaneity, even though he himself wants change to be timeless in a stronger sense of being altogether outside of time, not merely instantaneous. Aristotle had pointed out that some *energeiai* can be instantaneous, *EN* 1174b7. Perhaps thoughts would be an example, but this is not a characteristic of all *energeiai*. Another thing that can be instantaneous for Aristotle is *having* completed a change, such as a pond's *having* frozen over all at one go (*athroon*), *Phys.* 1.3, 186a15-16; *Sens.* 7, 446b28-447a6. Plotinus seizes on this in 6.1 [42] 16 (33-7), to argue that change is timeless in his

different sense, without noticing that Aristotle is talking about *having* changed, not about changing.

Aristotle does, however, invite misunderstanding, in three passages in his discussion of change (*kinêsis*) in *Physics* 3, chapters 1-3. He there contrasts *energeia* (and equivalently *entelekheia*) with *dunamis*, as an actualisation as opposed to a potentiality awaiting actualisation. In this usage, *kinêsis*, so far from being contrasted with *energeia*, can actually be an *energeia*. For example, in one of the three passages, *Phys.* 3.3, 202a22-b22, Aristotle describes the *energeia* (activity or actualisation) of a teacher as being a *kinêsis*, which is located not in the teacher, but in the learner. Plotinus exploits this use of *energeia* for the *kinêsis* of teaching, when in 6.3 [44] 23 (6-22) he talks of causing your feet to walk. But confusingly, Plotinus speaks of this as a *kinêsis* which comes to be *energeia* and resides in your feet (lines 13-20 are translated in **6(g)**).

There are two further passages in *Physics* 3.1-3 which for similar reasons caused confusion to the commentators, of which the first is:

(1) Aristotle *Phys.* 3.2, 201b31-2

Change (*kinêsis*) is thought to be a sort of activity (*energeia*), but incomplete (*atelês*). RRKS

Plotinus seizes on this at 6.1 [42] 16 (1), to support his idea that *energeia* is the genus of *kinêsis*. But not only is Aristotle reporting the views of others; he would also think that *energeia* was a rather confusing description, although 'incomplete' was exactly right. Change could be an *energeia* in the sense opposed to potentiality (*dunamis*), but not in the sense opposed to process (*kinêsis*). Wisnovsky, however, has shown that some commentators thought that Aristotle was endorsing the whole description without qualification, and feared that even the claim of incompleteness was problematic, on the grounds that it clashed with the idea expressed in the third of the three confusing passages. This occurs in Aristotle's definition of change in *Physics* 3.1, to which we shall turn next, according to which change is an *entelekheia*, which might be rendered 'completion'. I shall argue that, properly understood, the claims are consistent.

Reading

S.E. Gersh, *Kinesis Akinetos: A Study of Spiritual Motion in the Philosophy of Proclus*, Leiden 1973

Dominic O'Meara, 'Plotinus on how soul acts on body', in id., ed., *Platonic Investigations*, Washington DC 1985, ch. 10, 247-62.

Robert Wisnovsky, *Avicenna's Metaphysics in Context*, London & Ithaca, NY 2003.

2(b) Change as a completion (*entelekheia*)

In the first of the three chapters on change, *Physics* 3.1, Aristotle gave rise to more confusion when he defined change (*kinêsis*) as a completion (*entelekheia*) or actualisation.

(1) Aristotle *Physics* 3.1, 201a10-11

The completion (or actualisation, *entelekheia*) of what is potential, as such, is change. RRKS

2(b) Change as a completion (entelekheia)

The first point to be made is that Aristotle means that change actualises a potentiality, not that it is at every moment complete. But secondly, Themistius saw, *in Phys.* 69,8-20, that it is also crucial what is meant by 'what is potential'. The completion of the bronze matter of a statue as having the capacity to *have* been sculpted, would be a statue. But the completion of the bronze as having the capacity to be *in process of being* sculpted would be a change (*kinêsis*), the process of being turned into a statue. Philoponus, *in Phys.* 342,16-343,12, copies Themistius almost verbatim, and adds further amplification. In modern times, Kosman and Christopher Taylor draw similar distinctions. And there is a related criticism of Plotinus endorsed by Simplicius at his *in Cat.* 307,30-308,10.

These distinctions show how it is possible for a change to be incomplete, and yet a completion of *something*. They also show how Aristotle can say not only of change, but also at *On the Soul* 2.1, 412a19-28 that the soul is a completion (*entlekheia*). It is, of course, the completion of a very different sort of thing, namely of a natural organic body having life potentially. Despite the important clarification by Themistius, some commentators, as Wisnovsky shows, were very puzzled by these questions.

(2) Philoponus *in Phys.* 342,10-343,12, incorporating Themistius *in Phys.* 69,8-20

Having assumed these [axioms], he next says what change is, defining it as follows: change is the actualisation (*entelekheia*) of that which is potentially, in so far as it is such. The word 'actualisation' in Aristotle signifies actuality (*energeia*) and completion (*teleiotês*), for it is a compound of the words *hen* ('one'), *teleion* ('complete') and *ekhein* ('have a certain state'). When any particular thing possesses its own completion, it is said to exist in actualisation. The added words 'in so far as it is such' stand for [Themistius 69,8-20 starts here] 'insofar as it is potentially that thing in particular', in order that the *actualisation* may come into being while the potentiality, whose *actualisation* it was, persists. For the actualisation in the case of anything is of two kinds, one when the thing is already in its completed state, and has rid itself of all potentiality, one of the thing when, having changed from its potential state, it undergoes qualitative change according to its potentiality, and is being turned into its form.

[342,20] An example is the bronze which is potentially a statue. For its actualisation may consist (a) in its becoming (*ginêtai*) a statue, being shaped in a certain way by the statue-maker, or (b) in its having already become (*gegenêmenos*, Themistius: *genêtai êdê*), a statue and having received the completed form of the statue. This [second] actualisation comes without preserving the potentiality which made it possible for the statue to come into being; for it is already a statue and no longer retains the potential, so that this completion is not that of the potentiality (how so, when it destroys it?) but of the thing in which the potentiality existed. But the actualisation first spoken of, by which the statue was coming into being, still conserves the potentiality.

[342,28] Actualisation of this kind, then, he calls change and the completion of potentiality, since all completion preserves what it completes. For

as long as the potentiality is preserved, so also is the change which completes the potentiality; but when the potentiality ceases, so also does the change. The potentiality ceases when form and shape supervene [end of Themistius]. This, then, is change, the completion of that which has being potentially in so far as it has being potentially.

[343,3] That this is indeed change he also shows by an example. The buildable, he says, when it is a thing of such a kind in actuality (I mean when it is being built) is at that time subject to change (for it is being turned into the form of a house, and that sort of thing is building), but that which is being built still contains potentiality (for it is still buildable); as, once it is completely built, it no longer preserves the potential nor is undergoing change. If, now, building is a change, and the building is still in potential, it is right to say that the actualisation of that which has potential being, in so far as it has it, is change, since the first actualisation is a change and the completion of potentiality. ME

Reading

L.A. Kosman, 'Aristotle's definition of motion', *Phronesis* 14, 1969, 40-62.
C.C.W. Taylor, 'States, activities and performances', *Proceedings of the Aristotelian Society* supp. vol. 39, 1965, 85ff.
Robert Wisnovsky, *Avicenna's Metaphysics in Context*, London & Ithaca, NY 2003.

2(c) Aristotle's second definition and the exclusion of relational change

Aristotle gives two definitions of change in *Physics* 3.1; 3.2. Immediately before the first definition, at 200b33-201a9, he leaves a rather confusing impression as to whether there is change in respect of relation, or only in respect of place, quantity, quality and substance. Having started by saying that change (*kinêsis, metabolê*) is always (*aei*) in these four respects, he finishes by saying that there are as many kinds of change as there are categories of being, which would suggest ten kinds. The ambiguity is resolved in *Phys.* 5, where he says that in respect of relatives there is no change, except accidental (*kata sumbebêkos*) change (which he has agreed to dismiss, *apheisthô*, 224b27), because it is possible that *without a thing's changing at all*, a different relational property becomes true of it (*Phys.* 5.2, 225b11-13 = *Metaph.* 11.12, 1068a11-13; similarly *Phys.* 7.3, 246b11-12; *Metaph.* 14.1, 1088a30-5). The idea that one of the two relatives 'does not change at all', when e.g. Socrates comes to be shorter than the growing Theaetetus, is taken from Plato *Theaetetus* 155B-C, and is further endorsed by the Stoics *ap.* Simplicium *in Cat.* 166,17-29; 172,1-5.

Alexander *ap.* Simplicium *in Phys.* 436,26-32 and Philoponus *in Phys.* 367,6-369,1 argue that Aristotle's second definition of change (*Phys.* 3.2) restricts change to the changeable, and no longer allows it to everything potential, precisely so as to confine change to four categories.

(1) Aristotle *Phys.* 3.1, 201a10-11; 3.2, 202a7-8

The actualisation [completion] of what is potential (*dunamei*) as such is change (*kinêsis*). ...

2(c) Aristotle's second definition and the exclusion of relational change

And that is why change is the actualisation [completion] of what is changeable (*kinêton*) *qua* changeable. RRKS

(2) Aristotle *Phys.* 5.2, 225b11-13

Nor [is there change (*kinêsis*) in the category] of relation. For when one of the *relata* transforms (*metaballein*) [change can be] both truly predicated and not truly predicated of the other, which does not transform, so that change in this case is *per accidens*. ARL

(3) Alexander *ap.* Simplicium *in Phys.* 436,26-32

'And it seems', says Alexander, 'that he now says more clearly what change is than when he said that it was the actualisation of the potential *qua* potential. For, indeed, while the potential is in all the categories, not all the actualisation of the potential *qua* potential is change. At any rate relations are potential in so far as potentiality becomes actuality, as for example the potentially double becomes actual and there is no necessity for it to be changed, but it does so through that of which it is double being set beside it. JOU

(4) Philoponus *in Phys.* 367,28-369,1

As I have said, he is giving the definition of change more accurately in the light of what has been said, saying that it is not the actualisation (*entelekheia*) of the potential *simpliciter*, but of the changeable. For one might say, as an objection to the previous definition, that what is potentially to my right, when it becomes this in actuality through my displacement (say) to the left, alters to actualisation from its potential being, yet is not changed. And this is well said, then, against those who find it difficult that only what is potentially to the left has changed and not what is potentially to the right, and also that there is only one potentiality in related things. For their relation towards one another is either a potentiality or an actuality (*energeia*), the actuality being that of the present relation, the potentiality that of its opposite, at least in those cases where complete inversion is possible. Thus in the case of father and son, since it is not possible for the son to become the father of his father, there is not even potentially the opposite relation for the same people, but in the case of the right and left and the like, one relation is the actuality of the current position and the potentiality of its opposite. If, however, there is one relation of related things, in which the right and the left, the before and the behind, are mutually related and said to be so, then somehow it is altogether necessary that if either has changed the other has changed as well. For the right and the left subsist in a relation of this kind. So when the relation has changed, both those states which subsist in respect of it would undergo change as well.

[368,18] But Themistius says flatly that actuality with regard to the relation does not preserve the potential in the way that actuality with regard to qualitative change preserves what is potential in the transformation (*metabolê*) from potentiality to complete actuality; instead, he says, the transformation from potentiality to actuality happens all at once. There is at least a single actuality that is observed in them properly and *simpliciter*, but this is still incomplete. For what is to the left does not gradually come to be on the right by moving with regard to things on the left, but without taking time, and I, when I move to the left, undergo a change of position, but not of relations. First, then, it is necessary to show the actuality of such things to be incomplete, and then to refute the definition [by showing] that it is not through change that the actual state is brought out of the potential one.

[368,29] But, granted that this difficulty is to be dealt with in this way, Aristotle, in view of the fact that potential being belongs to every category but change does not belong to all, reasonably amends his definition. ME

Simplicius is worried at Aristotle's restriction. He would rather that Aristotle had made a terminological distinction, allowing 'transformation' (*metabolê*), as the wider term, to extend beyond the four categories of change (*kinêsis*), *in Phys.* 861,5-20. Moreover, he cites Aristotle's successor Theophrastus (*in Cat.* 435,28-31; *in Phys.* 412,31-413,9), and Alexander (*in Phys.* 409,12-32) as allowing change in the other categories. But Theophrastus, he thinks, goes too far, in not distinguishing change of place, quantity and quality, as affecting the disposition (*diathesis*) of a thing, from changes which merely affect its relationship (*skhesis*), a distinction suggested by Eudemus, *in Phys.* 861,5-26; 859,16-27.

(5) Simplicius *in Phys.* 861,5-26

But Eudemus said that transformations (*metabolai*) of disposition (*diathesis*) come about by another type of change and not the above. For even Aristotle himself, as he goes on, says that loss is contrary to gain and thinks it right to call these transformations, saying 'therefore coming to be is contrary to ceasing to be and loss to gain'. But these are transformations, not changes (*kinêsis*). But if somebody wishes that there should not be change at all in these categories, transformation must be divided no longer only into coming and ceasing to be and change, but another species must be added which fits with transformations in relation (*skhesis*), so that the transformation from not-substrate to substrate will be coming to be, that from substrate to not-substrate ceasing to be; but the remaining one from substrate to substrate must be divided into that with regard to disposition, which Aristotle thinks fit to call change (*kinêseis*), and that with regard to relation (*skhesis*), which he refuses to call a change since it exhibits no difference in the substrate, but which he also calls transformation because there is no specific name for the kind. And I think it true to say that as he does not think fit to say that things which change in part change as such, but includes them with things that change incidentally, still more he

should not say that those things change as such which are transformed with regard to relation and those that are so when other things change. But the inquiry was about things that change as such, so that even if Theophrastus says that there is change in all the categories, he spoke without making a distinction, having as yet neither distinguished change from transformation, nor what is as such from the incidental. JOU

Pace Theophrastus:

(6) Theophrastus *ap.* Simplicium *in Cat.* 435,28-31, included in FHS&G 153A

I want to demonstrate that even Theophrastus, the best of Aristotle's pupils, concurs with my suppositions. For he speaks as follows in the first book of his *Physics*: 'It is not difficult to expound the common and general account of change, and say that it is a certain incomplete activity of what is potential *qua* such [i.e. *qua* potential], in respect of each genus of the categories, and this is also more or less apparent from perception.' RG

(7) Theophrastus *ap.* Simplicium *in Phys.* 412,31-413,9, FHS&G 153B

I know that it seems rash to speak out contrarily to Aristotle, but, until we are able to recognise accurately the explanation of his sort of classification, we are sufficiently encouraged by the agreement of Eudemus quoted with regard to time, and still more by that of Theophrastus, who clearly views change and transformation as being in all the categories. At any rate, he says in the second book of his *On Change* that 'it is more appropriate, as we say and as is the case, that the actuality (*energeia*) of the potentially changeable *qua* changeable should be in respect of each of the other categories, such as substance, quality, quantity, travel and the rest. For such are qualitative change, growth, travel, coming to be, and their opposites'. But in the third book he wrote as follows, still more clearly, I think: 'In the delimitation of change we say that there are as many species of it as there are categories. For we say that change is the actualisation of what is potential as such.' Also in the same book he says this: 'There is not change of the relative in its account, but there is of that which is potential. For its actualisation is change and as such'. JOU

(8) Alexander *ap.* Simplicium *in Phys.* 409,12-32

But in the case of relatives why would there not be change since there is opposition, as Aristotle himself agrees in the *Categories* [6b15], where he says, 'Opposition occurs in relatives, e.g. excellence is opposite to badness, each being relative, and so is knowledge to ignorance'? For even if when the one on the right moves, the one formerly on the left comes to be on the right without moving and thus is transformed incidentally, still first he

who formerly stood on the right, and moved not incidentally but himself, exchanged his position on the right together with his place, having come to be on the left. Also, since relative position derives not from one of them but from both, he who did not move gained the relative position not incidentally but as such, as it was changed together with him who changed his place. It is just as if someone by pushing down one end of a rod makes the other move upwards, not incidentally but as such, because there is one motion of both the ends. Alexander approves of this view, as one hears from what he says a little later, as he explains the passage [202a7] which says 'therefore change is the actualisation of the changeable *qua* changeable'. For he says: 'Or, even in the case of the relative, on the one hand what is potentially double has not been changed, but what was potentially half was changed, in order that the former should become double. On the other hand, the potentiality of the potentially double was not another potentiality from that of the potentially half, so that with regard to the actualisation of the potentiality the change in them also produced the different relationships of the relata, since there was a single potentiality with regard to the subject matter'. JOU

(9) Simplicius *in Phys.* 859,16-27

But perhaps Aristotle regarded change (*kinêsis*) as being transformation (*metabolê*) of the subject in its condition (*diathesis*) and so denied it in all categories that were relational and weak and did nothing observable to the condition of the subject. For posture (*keisthai*) and having on (*ekhein*) seem to imbue the substrate with no permanent condition. For what difference does it make to a body whether it lies prone or supine and has a ring on or not? Time also seems to have been regarded as insignificant. That is why he in no way says that it is the cause of coming to be but of ceasing to be alone, and of that only because he sees no other cause. Relationship to something is similar, which, I think, is why he indicated the reason why there is not change in categories of relationship as being that it did not affect the subject's disposition, saying 'for it is possible when one thing is transformed for it to be true that the other is in no way transformed' [*Phys.* 5.2, 225b11-13] i.e. is not affected as neither losing nor taking on any disposition. JOU

Reading

Concetta Luna, 'La relation chez Simplicius', in I. Hadot, ed., *Simplicius, sa vie, son oeuvre, sa survie*, Berlin & New York 1987.

Richard Sorabji, *Matter, Space and Motion*, London & Ithaca, NY 1988, ch. 11, 197-8.

3. Divine Knowledge and Power

3(a) Divine knowledge

It is easy to suppose that God must have the attributes of the Christian God, being omniscient, omnipotent and a Creator. But many ancient philosophers denied these attributes, as will be further seen under **8(c)**. We shall first review some of the possible obstacles to divine knowledge.

(i) God avoids mental changing by knowing just one thing

(1) Aristotle *Metaphysics* 12.9, 1074b21-7

Again whether mind (*nous*) or thinking (*noêsis*) is the substance of it, what does it think (*noein*)? For either [it thinks] itself or something else, and if something else, either the same thing always or another. So is there some difference or none between thinking the fine (*kalos*) and [thinking] any chance object? Or [would it be] even absurd [for it] to consider (*dianoeisthai*) some things? It is clear therefore that it thinks the most divine and honourable [thing], and does not transform, for the transformation (*metabolê*) would be for the worse, and such a thing would already be some kind of change (*kinêsis*). ARL

(ii) Restrictions on God's knowledge

On future contingents as unknowable even for God:

(2) Alexander *On Fate* 30, 200,12-22

To say that it is reasonable that the gods should have foreknowledge of the things that will be, because it is absurd to say that they fail to know anything of the things that will be, and, assuming this, to try to establish by means of it that all things come to be of necessity and in accordance with fate – [this] is neither true nor reasonable. For if the nature of the things admits of this, there is no one for whom it would be more reasonable to know the things that are going to be than [it would be] for the gods [to do so]; but when [the nature of the things] is not able to admit of such prediction and foreknowledge, it is no longer reasonable even for the gods to know anything that is impossible. For the things that are impossible in their own nature preserve the same nature even where the gods are concerned. For it is impossible even for the gods either to make the diagonal commensurable with the side [of a square], or twice two five, or any of the things that have happened not to have happened. RWS

(3) Alexander *On Fate* 30, 201,13-26

But since to have foreknowledge of the things that are going to be is to have cognisance of them *as being such as they are* (for having foreknowledge is different from bringing about), it is clear that he who has foreknowledge of things that are contingent will have foreknowledge of them *as such*. For it is not foreknowledge to say that what is contingent will be in the manner of [what] will be necessarily. So the gods too would have foreknowledge of the things that are contingent *as contingent*, and necessity will not at all follow on this on account of foreknowledge of *this* sort. And it is in this way that we actually listen to those who make predictions. For those who make predictions along with advising someone to choose and do what he should, do not speak about the things they predict as things that will be of necessity.

And in general, if [i] they say that *all* things are possible for the gods, and even impossible things will be possible for them, it will not indeed be shown through their foreknowledge concerning the things that are going to be that all the things that come to be do so of necessity. But if [ii] they concede that the things that are impossible are so also for the gods, they should first show that this sort of foreknowledge [i.e. the sort that they assert – as opposed to foreknowledge of the contingent as contingent] is possible, and *then* attribute it to the gods. RWS

Gods do not know individuals, who are unendingly replaced. Cf. (4), (5) for Alexander's point that it is beneath God to *attend* to individuals.

(4) Alexander *On Providence* 13,14-17, translated under **4(a)**

(5) Alexander *On Providence* 25,1-16, translated under **4(a)**

(6) Alexander *in Metaph.* in Averroes = fr. 36 Freudenthal, translated from German of the Hebrew of Averroes' *Epitome* of Aristotle's *Metaphysics*

And Alexander says that the greatest error is committed by those who are of the opinion that providence extends to individuals, as the tent-dwellers suppose ['tent-dwellers' is the Arabic rendering of philosophers from the portico, i.e. Stoics]. Providence can only proceed from them [the heavenly powers] if they have knowledge, as has been argued already; and how is it possible that they should have a knowledge of individuals that constantly renews itself, especially since this is unending? And the person who speaks thus necessarily ascribes wickedness to God. For if he determines the fate of each individual, how does it come about that evil happens to an individual man, while God rules over him? But I understand by these evils those that could possibly not happen to him; of necessary evils one should not believe, when they happen to anyone, that they do not come from the Deity. RWS

Unnamed report of arguments for denying divine omniscience:

(7) Maimonides *Guide* 3.16

After having laid this foundation, which is the ruin of all good principles, and destroys the majesty of all true knowledge, they sought to remove the opprobrium by declaring that for many reasons it is impossible that God should have a knowledge of earthly things, for the individual members of a species can only be perceived by the senses, and not by reason; but God does not perceive by means of any of the senses. Again, the individuals are infinite, but knowledge comprehends and circumscribes the object of its action, and the infinite cannot be comprehended or circumscribed; furthermore, knowledge of individual beings, that are subject to change, necessitates some change in him who possesses it, because this knowledge itself changes constantly. They have also raised the following two objections against those who hold, in accordance with the teaching of Scripture, that God knows things before they come into existence. First, this theory implies that there can be knowledge of a thing that does not exist at all; secondly, it leads to the conclusion that the knowledge of an object *in potentia* is identical with the knowledge of that same object in reality. They have indeed come to very evil conclusions, and some of them assumed that God only knows the species, not the individual beings, whilst others went as far as to contend that God knows nothing beside Himself, because they believe that God cannot have more than one knowledge. MF

God can't know change without changing, and he doesn't change:

(8) Plotinus 4.3 [27] 25 (20-4)

But what prevents [a divine being] from having knowledge (*eidenai*) of changes in other things, such as the revolutions of the heavens, even though it does not itself change?

The answer is that it will have intellection that one thing is earlier and another later by following the changes of what is being altered. Recollection is not the same as intellection. BF

The divine heavenly bodies need neither memory nor attention to the details of their movements.

(9) Plotinus 4.4 [28] 8 (21-52)

My meaning is as follows. If, as we walk from one place to another, it is not of prime concern to us that we are passing now through this, now through that portion of air – or even that we are passing through it at all – then we could have no visual or mental awareness of the air as we proceed. For if it were not a prime concern to complete a particular section of our journey, and if we were able to travel through the air, then it would be of no importance for us to know just where we were or how much ground we had

covered. Furthermore, if we needed to travel, not over a particular period of time, but merely to travel, giving our action no reference to time, then we would not commit different moments of time to memory.

[30] It is a well-known fact that when the mind grasps (*ekhein*) an activity which is in progress as a whole and has no reason to doubt that it will run its due course, then it no longer pays any attention (*prosekhein*) to the details as they occur. Indeed, when you do the same thing time and time again, there is little point in observing each repeated step closely.

[34] So if the stars are carried along in their circuits because they are engaged in their own concerns and not in order to travel the distances they do in fact travel; and if it is no business of theirs to view the things they pass, or even to pass them; and if their progress is incidental and their purpose is fixed on other, greater concerns; and if they always pass along the same path; and if the time taken over any particular part of it is not subject to calculation – even if it could be; well, if all this is the case, then there is no necessity for them to have any memory of the places passed or the periods of time spent. They share the same life because their local movement revolves round the same point – not a spatial but a vital movement, the movement of a single, self-directed, living creature, which is at rest in relation to what is external to it, but in motion in its own eternal inner life. Indeed, to make a comparison, if a dance ever comes to halt, the whole is perfect, completed from start to finish, although at each stage it was incomplete; but if it were the sort of dance that went on eternally, it would be eternally perfect. And if it is eternally perfect, it will have no time or place in which it will be completed, so that it will not even have a yearning for this and will not consequently be the measure of any time or place, nor have any memory of these. BF

(iii) Iamblichus' revision that knowledge takes its character from the knower not the known

This was a major contribution to explaining how God could have knowledge.

(10) Iamblichus *ap.* Ammonium *in Int.* 135,14ff.

We answer in accordance with the teaching of the divine Iamblichus and we shall think it right to distinguish the various degrees of knowledge by saying that knowledge (*gnôsis*) is intermediate between the knower and the known, since it is the activity of the knower concerning the known – for example, the activity of sight concerning the pale – and it sometimes knows the known in a way better than the nature of the knowable thing itself, sometimes worse, and sometimes on the same level. DB

Not yet in Porphyry:

(11) Proclus *in Tim.* 1.352,5-16

The gods themselves know what is generated without generation, and what is extended without extension, and what is divided without division, and what is in time eternally, and what is contingent necessarily. For by the very act of thinking (*noein*) they produce all things and what they produce they produce from the undivided and eternal and immaterial forms; so that they also think them in this way. For let us not suppose that knowings are characterised by the natures of the things known, nor yet that what is not fixed is not fixed among the gods, as the philosopher Porphyry says, ... but that the manner of knowing becomes different through the differences in the knowers. RWS

But for a similar principle cf. earlier (second century AD) the Christian Pantaenus in Clement of Alexandria fr. 48 ed. Stählin, vol. 3. Porphyry *Sentences* 10, 4,7-10 Lamberz, does recognise a related principle, that all things are in all things, but in each according to its essence, as does Plotinus 5.8 [31] 4 (6-11). On this see further E.R. Dodds, notes to Proclus *The Elements of Theology* §103, Oxford 1933, p. 254.

Augustine and Ammonius ascribe to God changeless knowledge of the passage of time, although Ammonius would not have known Augustine's Latin text. They do not anticipate Avicenna's objection that there is something (see below) God cannot know about passage, if he does not change.

(12) Augustine *ad Simplicianum* 2.2.2, lines 27-56

What is foreknowledge (*praescientia*) but knowledge (*scientia*) of the future? But what is future to God who transcends all times? For if God's knowledge possesses (*habet*) the things themselves, they are not future to him, but present, and so it can no longer be called foreknowledge, but only knowledge. On the other hand, if the future is not yet with him, just as in the order of temporal creatures it is not, and instead he anticipates the future in his knowledge, he will be aware of it twice over, once in accordance with his foreknowledge of the future, and differently in accordance with his knowledge of the present. In that case, something temporal will happen to God's knowledge (which is a most absurd and false supposition), for he cannot know after their arrival the things he foreknew before their arrival, except by noting them twice, that is, by foreknowing them before they occur and by knowing them when they have occurred. In that way there will come about something far removed from the truth, that something temporal happens to God's knowledge. For temporal things which are foreknown are also sensed when they are present, although they were not sensed before they occurred, but only foreknown. But if nothing new is going to happen to God's knowledge, even upon the arrival of things whose arrival was foreknown, but rather that foreknowledge will remain just as it was before the things foreknown arrived, how can it still be called foreknowledge? For it is not knowledge of the future, since the future which he saw is now present and a little later will be past, and knowledge of the past or present

cannot in any way be called foreknowledge. Thus we return to the result that what was foreknowledge, when these things were future, becomes knowledge, when the same things are present. And since that which was previously foreknowledge comes subsequently to be knowledge in God, he suffers mutability and is temporal, even though he is God, who truly and supremely is, mutable in no part, and temporal in no new motion. Therefore it is fitting not to speak of God's foreknowledge (*praescientia*), but only of his knowledge (*scientia*). RRKS

(13) Augustine *City of God* 11.21, lines 12-26 Dombart and Kalb *CCL* 48

It is not that God's knowledge varies in any way, so as to be affected in one way by things which are not yet, in another by things which already are, and in another by things which have been. For he does not in our manner look forward to what is future, or contemplate what is present, or look back at what is past; but works in some other way removed far above the habits of our thinking. He sees altogether unchangeably, without his thought changing from this to that, in such a way that he comprehends in a stable and sempiternal present all the things that happen in time, whether they are yet to be in the future, or already present, or already over in the past. He does not see them in one way with his eyes and in another with his mind, since he does not consist of mind and body. Nor does he see them in one way now, in another way beforehand and in another way afterwards. For his knowledge of the three times, present, past and future, does not change in diversity like ours. RRKS

(14) Ammonius *in Int.* 133,15-27

The gods cannot be ignorant of our affairs, nor can their knowledge be indefinite, so that they guess how things are going to turn out. For, first, as Timaeus taught us and as Aristotle himself affirms in his theology, and before them Parmenides, not only Plato's Parmenides but Parmenides speaking in his own words: with the gods nothing is either past or future, given that each of these lacks being, the one being no longer and the other not yet, the one having changed and the other being of a nature to change; and given that there is no way to connect things like that with things that really have being and that do not admit of change even in thought. For what is altogether unchangeable must take precedence over what changes in any way, in order that the latter may even remain in a state of change. So with gods who are related to things as their source, there is no possibility of the past or future being contemplated. Everything with them is situated in the single, eternal now. RRKS

(15) Ammonius *in Int.* 136,1-3; 15-21

Since this is so, we must say that the gods know all that has happened, or

is, or will be, or is about to be, in the way that is appropriate to gods, that is, with a single, definite and unchanging knowledge.

For they must know divisible things in a way which is indivisible and unextended, and pluralised things unitarily, and temporal things eternally and generated things ungeneratedly. For we shall not allow anyone to say that the knowledge of the gods runs along with the flow of things nor that anything in their case is past or future. Nor, as we have heard from Plato's *Timaeus* [37E], shall we allow that 'was' and 'will be' are said in their case, words which signify some change. RRKS

Avicenna (*c.* 980-1037) and the Islamic 'philosophers' mentioned by Ghazâlî (AD 1058-1111) offer a reply. A changeless God cannot change from thinking 'the eclipse is present' to thinking 'the eclipse is past', and so, there is something he does not know. It is no defence to claim this is one and the same knowledge of one and the same event. For the thing known is different, and even if it were not, God's relation to the thing known would change: Ghazâlî *Destruction of the Philosophers*, incorporated in Averroes *Destruction of the Destruction*, translated by van den Bergh 275-8 from Bouyges 456-9. There is a more recent translation by Michael Marmura.

Reading

Richard Sorabji, *Time, Creation and the Continuum*, London & Ithaca, NY 1983, 260-4.

Two further applications of Iamblichus' principle, that knowledge takes its character from the knower not from the known, are designed to recognise God's knowledge, while preventing it from implying determinism. One plea, already in Proclus, is that although the future is indeterministically indefinite, God's knowledge does not need to be indefinite (*indeterminatus*). That would mean that he knows only 'it may or may not be'. On the contrary, he can have *definite* knowledge of an indefinite future, and certain knowledge of an uncertain (*dubius*) future.

Boethius is the first to avoid determinism by using Iamblichus' point to argue that God's knowledge of the future need not exist *already*, since he can have *timeless* knowledge of the temporal. The force of this argument will be explained below under **5(b)**. Timeless knowledge of the temporal is recognised also by Philoponus *Contra Proclum* 568,20-569,6, translated in **9(c)**.

God's definite knowledge of the indefinite future:

(16) Proclus *Prov.* 16.63,1-64,4 Boese

The one group say that it is not the case that God knows everything determinately (*determinate*); rather, they say that [his knowledge] is indeterminate in the case of things that come to be indeterminately, so that they may preserve the contingent. Others however attribute determinate knowledge to God, and so accept necessity as applying to everything that comes to be. These are the positions of the Peripatetic and Stoic schools [respectively]. But Plato, and whoever follows him, says *both* that God knows future things determinately *and* that these come to be in accordance with their own nature, some determinately, others indeterminately. For

where effects are divided and contrasted one with another, the gods' apprehension is only in accordance with the better [of the opposed characteristics]. For example, things that come to be are either incorporeal or corporeal, but the causes among the gods of *both* sorts are incorporeal; and so too [they have] knowledge [of them] as incorporeal. And again, there are things that are intelligible, and things that are unintelligible; but both are present to the gods intelligibly, both in their being and in their being known; for [the gods] have intellectual knowledge even of the unintelligible. And again, there are things that come to be in time, and things that come to be timelessly; but it is timelessly that both the cause and the knowledge [of these things] are established among the gods. So that, since some things come to be determinately, some indeterminately, [the gods] have knowledge of both of these in accordance with the better [of the opposites], that is, determinately.

[64] And further, the type of knowledge is not in accordance with the object of knowledge, but in accordance with what knows; and reasonably so. For the knowledge is not in the object of knowledge, but in what knows; and for this reason it is conformed and similar to that in which it is, not to that in which it is not. RWS

God's certain knowledge of an uncertain future:

(17) Proclus *de Dec. Dub.* Boese 2.6

Let us then go on, if you please, to examine a second question. We claim that Providence knows contingent things, and the ancients have set out the problem in its full depth. Because of this problem, some philosophers, who acknowledge [universal] Providence, have banished the nature of the contingent from among beings, whereas others, who maintain that the evidence of the existence of the contingent cannot be contested, deny that Providence reaches down to that level. Both sides started from the correct assumption that Providence would need to know the things of which it has providential care, and that when it knows them, its knowledge should not, because of the uncertainty (*dubius*) of the contingent, be itself uncertain in any way. It is not the purpose of the present discussion, then, to prove either of these two points, I mean that there is Providence for all things, and that contingency is not merely a word, but a nature belonging to beings. For our declared aim is this: we take for granted, as it were, that there is Providence and that it is of all the things which are considered beings, in order to solve the many difficult problems implied in this. JO

(iv) Omniscience

Omniscience is ascribed to God by the Stoics, but not by Alexander or Plotinus. Some Platonists, it will be seen under **5(b)**, stress that the knowledge of oracles is restricted by an 'if': '*if* this happens, that will happen'. But Iamblichus' idea, that knowledge takes its character from the knower, not the known, helps Proclus to postulate divine omniscience and so to defend universal Providence.

(18) Proclus *in Parm.* 958,30-5 Cousin

So then, his knowledge does not involve any trouble, because in his case the knowing element remains in itself, and by knowing itself alone knows all other things, and does not need sense perception or opinion or knowledge for the cognising of any of the objects of sense. GM, JD

(19) Proclus *de Dec. Dub.* Boese Q. 1.2

Before we look at other things – whether Providence extends to all things, to universal and to partial (*partes, merê*) things, even the most individual, to heavenly things and to those below the heaven, to the eternal and the perishable (for Providence needs to know the rank of the things under its providential care, or else it could not direct everything, each thing according to its rank, if it ignored their rank) – let us first examine how Providence knows everything, the wholes and the parts, the perishable and the eternal, and what its mode of cognition is. JO

(20) Proclus *de Dec. Dub.* Boese Q. 1.4,1-5

Beyond all these modes of cognition is the knowledge of Providence, existing above Intellect and by virtue of the One alone, according to which each god is a god and is said to have providential care of everything, situating himself in the activity that precedes that of intelligising. By this One, according to which it also exists, Providence knows everything. JO

(21) Proclus *de Dec. Dub.* Boese Q. 1.5,22-5

But that One [i.e. the One of Providence], remaining intransitive and undivided in its own One, also knows all things in the same manner, not only man and sun and everything of this kind, but also every single individual thing. For nothing escapes this One, whether this is said with respect to existence or to knowledge. JO

Reading

H.-N. Castaneda, 'Omniscience and indexical reference', *Journal of Philosophy* 64, 1967, 203-10.

F.P. Hager, 'Proklos und Alexander von Aphrodisias über ein Problem der Lehre von der Vorsehung', in J. Mansfeld, L.M. de Rijk, eds, *Kephalaion* , C.J. de Vogel Festschrift, Assen 1975, 171-82.

Norman Kretzmann, 'Omniscience and immutability', *Journal of Philosophy* 63, 1966, 409-21.

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L. Obertello, 'Proclus, Ammonius and Boethius on divine knowledge', *Dionysius* 5, 1981, 127-64.

Nelson Pike, *God and Timelessness*, London 1970.
Richard Sorabji, *Necessity, Cause and Blame*, London 1980, 112-13; 121-7.
Richard Sorabji, *Time, Creation and the Continuum*, London & Ithaca, NY 1983, ch.16, 258-64.
R.T. Wallis, 'Divine omniscience in Plotinus, Proclus and Aquinas', in H.J. Blumenthal, R.A. Markus, eds, *Neoplatonism and Early Christian Thought*, London 1981, 223-35.

3(b) Divine power, limitations

The limits on God's knowledge are matched by limits on his power. So Platonist Academics against Stoics in Cicero *ND* 3.39.92; *Div.* 2.41.86. Origen and Celsus agree, Origen *Against Celsus* 2.77; 3.70; 5.14; 5.23 (the last translated above under **1(f)**), as does Porphyry if his *Against the Christians* fr. 94 Harnack, from Macarius Magnes 4.24, is genuine.

Plato had put limitations on the creative power of the divine Craftsman and of the lesser gods, *Timaeus* 47E-48E; 75A-C. They could not give us skulls which both afforded maximum protection and left us maximally perceptive. Nonetheless, the Craftsman can override the natural tendency of the living stars to decompose, *Timaeus* 41A-B. Alexander replies that God cannot override nature, *Quaest.* 1.18, 32,3-4; 32,14-19, *ap.* Simplicium *in Cael.* 359,11-360,3, while Philoponus, claiming Galen as an ally, assumes that even if God could override a natural tendency to end, he could not override a natural tendency to begin, *Arabic Summary of a Lost Work*, trans. Pines 323-4, and *Contra Proclum* 600,14-601,20. Alexander and Philoponus are translated under **9**.

Alexander also denies that God can know future contingents any more than he can make the diagonal to be commensurable with the side of a square, or twice two to equal five, or can undo the past, *On Fate* ch. 30, 200,20-2, translated under **3(a)**.

Aristotle: although Aristotle *Phys.* implies that his divine unmoved mover has infinite power to cause motion, infinite power is not all power.

Aristotle declares that undoing the past is impossible for God, and quotes a verse of Agathon to that effect.

(1) Aristotle *Nicomachean Ethics* 6.2, 1139b10-11

Of this alone even God is deprived, making what has been done not to have happened. RRKS

Reading
Richard Sorabji, *Time, Creation and the Continuum*, London & Ithaca, NY 1983, 264-7.

In the passage quoted in **1(f)** above from the *Against Celsus*, 5.23, Origen denies that God can do everything, even where 'everything' is taken to exclude the unreal or inconceivable. For God also cannot do what is shameful.

Porphyry, however, agrees with Aristotle that God has infinite power, e.g. *Letter to Anebo* 1.2c Sodano, and uses the word *apeirodunamis* of infinite power at *Sentences* 37, 43,9 Lamberz. Similarly Ammonius *in Cat.* 6,12, translated in **Psychology 15(a)**.

4. Providence and Evil

4(a) How far does providence extend?

Plato *Laws* 10, 903B-905B maintains that God's concern is for the whole rather than for the part. As for the Stoics, although their God knows all things, his providence too is more concerned with the whole than with the part, and moreover (Cicero *ND* 2.167; Plutarch *St. Rep.* 1051C) can neglect small details.

Alexander, as an Aristotelian, restricts providence still further. Like some modern environmentalists, his providence is concerned with the species, not with the individual.

(i) Alexander

Providence and stellar motion preserve not individuals as such in our part of the world, but only enough individuals to preserve the species. The heavens are eternal and need no providence.

(1) Alexander(?) *Quaest.* 1.25, 40,28-41,4

[Each of the seven spheres carrying planets] is moved and carried round in this [motion] in an opposite direction to that [outermost sphere] because it possesses this sort of position and ordering, but it is also moved in a second motion by the first [sphere], being carried round with the same [motion] as it.

The cause for this double movement they have is that there must be some other body [the sublunary world] apart from that which is eternal and divine, [a body] subject to coming-to-be and passing away – for this sort of body too contributes [by serving as a centre] to the eternal rotation of [the heavenly spheres] – [together with the fact that] it is not possible for this sort of body to remain eternal in species if it is not governed by the complex movements of [the heavenly spheres]. RWS

(2) Alexander(?) *Quaest.* 2.19, 63,21-6

This [the heavens] is in no need of [some being] to exercise providence [over it], having in its own proper nature perfection with respect both to being and to well-being. But as much of [the world] as is subject to coming-to-be and passing away, and needs assistance from something else both for being and for the eternity in species [that comes about] through orderly change, this is that over which providence is exercised, being governed by the orderly movement of the divine part of the world and [its being] in a certain relation to it. RWS

(3) Alexander *Prov.* in Cyril of Jerusalem *Against Julian PG* 76, 625B-C

Well, Alexander, a distinguished person, in [his] *On Providence* speaks as follows: [The first of Cyril's two quotations is omitted, because, as confirmed by the Arabic version of Alexander *Prov.* 5,1-9 Ruland, that quotation represents the position of Alexander's opponent that nothing in the world escapes providence.] And elsewhere: 'For Aristotle says that the preservation and coming-to-be and everlasting permanence in species of the things here [on earth] does not come about without divine providence. For according to him the power from the sun and the other heavenly bodies which are companions of the sun is responsible for the coming-to-be of the things that are constituted by nature and for their preservation.' RWS

(4) Alexander *Prov.* 87,5-91,4 Ruland, Arabic version of Abû Bishr Mattâ

Nature extends divine Providence to things down here, to the point of generating their substance as well as the difference in substance and form [between the various species] found among them. For it is through their contact with the divine bodies up there that [some of] the power [of nature], which comes from God, is engendered in things down here – transient bodies with a power to receive [what nature provides] to the extent that their substance and form do come to be [if only for a time]. That power, engendered by the motion of divine bodies, which is imparted [to terrestrial bodies] in one way or another, as we explained,[1] [therefore] causes the [latter] to move like the former, in the sense that the successive generation of single particulars of the same form affords things down here a way to last for ever. The effect of that [successivity] is to bring out what is universal. For the generation of particulars serves to maintain the universal species they have in common. Socrates comes into being so that there be man[kind]; Achilles' horse Xanthus comes into being so that there be horse[kind]. Universals have their subsistence in singularities. It is by becoming like the imperishable beings[2] [of the celestial world] that things involved in coming-to-be are as imperishable as they are through their species. That is something afforded by nature and caused to exist among things down here as far as it is possible for them to share in everlastingness, as they can share in their species, which they [jointly] sustain as their [common] end. Single instances come and go. Individual differences existing between one member of a species and another, so as to make Socrates differ in substance from Plato, are not generated principally by nature but are inevitable accidents of the matter underlying things down here. FWZ

[1]The reading (*allatî tajrî* [*lahâ*]?) is unclear, as the explanation given at 73,6-75,5 is not. It is that, since there is no void, the celestial world and the terrestrial are in contact, directly at the interface between them, indirectly elsewhere.

[2]Reading *li-mumâthalat al-ghayr dâthirîn* instead of *li-munâsalat al-ghayr da'irîn* 'the reproduction of non-rotating beings' (Ruland).

But Providence does not extend to individuals because God does not know individuals: that would be beneath him:

(5) Alexander *in Metaph.* in Averroes = fr. 36 Freudenthal, trans. from German, translated above under **3(a)**

(6) Alexander *Prov.* 13,14-17 Ruland, Arabic version of Abû Bishr Mattâ

Again, those who say that God keeps an eye on every single particular, continually and unceasingly watching over all of them and taking care of them, are caught in absurdity by contradicting both themselves and [certain] propositions generally taken for granted [as incontrovertible premisses]. FWZ

(7) Alexander *Prov.* 25,1-19 Ruland, Arabic version of Abû Bishr Mattâ (Cf. *Prov.* 11,6; 15,15ff.; 19,3; 25,1; 33,1ff.)

Yet it is shamefully absurd to suppose that God knows and watches all things in existence and whatever may issue from them. That is something no one of sound understanding would assert of [either God] or man. For the claim that [a master's] care (Providence) extends to everything in his household, including mice, ants, and everything else alike, is open to the objection that it would be neither pleasant nor fitting for a gentleman to have to keep his whole household in order, allotting to everything its proper place and share. Rather, the higher [someone's] standing in [a household], the more alien he will deem such acts of supervision to himself. If such occupations do not befit people, intelligent or not, it follows all the more that God is above having it said of him that he attends to both people and such lesser beings as mice and ants, and that his care (Providence) attaches to both people and other things down here in the manner described. Moreover, he would be a cause even of evils. FWZ

For Alexander, see further Maimonides *Guide* 3.17. Providence is exercised by the heavens towards the sublunary realm, knowingly, but not primarily for its sake.

(8) Alexander *Prov.* 57,8-67,9 Ruland, Arabic version of Abû Bishr Mattâ

The substance of God and the benefit issuing from it are not like that. Rather, he causes great goods for *all* beings, [from which they benefit] according to their ability to partake of them, by sustaining this [universe as a] whole and the [very] nature of all beings. His own life is one of utter happiness. The fact that he provides for the well-being of the remaining things and for [benefits] ensuing in [their][1] dwelling-place down here

should be seen as a *secondary* [consequence] of [his] generosity. For [it is] not [enough] merely [to grant] that there is in it no trace of envy towards the things proceeding and ensuing from it; [we must also adopt as] the most appropriate [view that] everything *primarily* ensuing from [what goes on at] the level of the gods will proceed according to [their] will and choice [which would make their life less than happy if it had to attend to secondary consequences as well]. How providence works in Aristotle's view and how far it goes is something we must attempt briefly to tell as best we can. In his view, one may speak of Providence – i.e. the fact that the gods provide for the primary events of nature – in two ways. The Philosopher [Aristotle] certainly holds that there is Providence down to the sphere of the moon. But he also holds that Providence is concerned with things below the sphere of the moon, i.e. the [terrestrial] world. For it is he who asserts that a man is begotten by a man and the sun [*Phys.* 194b13]. In his view, the entire order of things down here is that of the motion of the divine bodies [of the celestial world]. Hence [Providence exists in both worlds, but in different ways]. To say that there is Providence down to the sphere of the moon is but to say that there it exists in the sense that it occurs in that from which it issues. Providence there occurs in that which provides for the things to be provided for.

It is in and from the divine body in its entirety that Providence [originates], which in Aristotle's view is the whole body [of the celestial world] terminating in the sphere of the moon. That is why[2] Providence is concerned with things down here. For what by its own nature is as everlasting and well-ordered as is the whole divine body needs no help of any kind from anything else in order to lead its existence. It is below the sphere of the moon that, in Aristotle's view, Providence exists[3] in the sense that it occurs in the things for which it provides – things *needing* Providence as things down here do. For in order to exist at all they need the help of something else.

Whatever provides, provides *for* something. So, too, the divine body, given that[4] it does exercise Providence. But it cannot be for itself that it is providing, because it has no need for that at all. It remains [to think] that it provides for something else. But as anything which is not a divine body will be a changeable body in [a state of] coming-to-be, i.e. the kind of body [found] below the sphere of the moon, it must be towards that [sublunary world] that Providence is directed. It follows that the Providence of the divine body cannot be directed at what is unlike it entirely by *accident*. For it cannot be by accident that a providential act[5] provides for what necessarily ensues from it – unless it were characterised by that [accidentality] throughout, [with its agent] being unaware, [not only of its target, but] also of its source, [thus making it an act of *unconscious* Providence, which is a contradiction in terms]. Neither can the Providence of the gods be concerned with things down here in all respects *primarily*, so as to make action *for the sake of* things down here its proper purpose.

Neither mode would be worthy of gods. It is incongruous to attribute to

gods acts of Providence primarily providing for things down here, as though proper acts [of providence] were performed *for the sake of* the existence and order of things down here and its motions were directed to that end. For as we said more than once, whatever is there for the sake of something else is inferior to it; and the claim that God's Providence works like that entails precisely that God exists for the sake of things down here. What could be less warranted than the claim that God's principal concern is with particulars down here, to provide for them and maintain them in all their multitude and all their conditions and functions, by watching over them and their affairs? Such a view is clearly not only unwarranted but also impossible.

It is equally absurd in every way to claim that he is unaware of what happens because of him. [Aristotle saw that] it was necessary [to take the view] that the gods know above all else[6] that their proper nature is productive of goods; and knowing that, they were bound to know the things ensuing from such a nature. For it is incongruous that someone aware that his nature entails [imparting heat should not][7] know that it will heat whatever is susceptible to being heated, or that a producer of goods should not know those goods, which proceed from him and are generated by him, as a consequence of knowing that he produces them. [The conviction] that the gods *know* about the goods generated by them will be accompanied by [the conviction] that the whole process at the same time results from their *choice*. For it is peculiar to them to know the substance and nature of things relative to themselves because it is by their will that all things which owe their existence to them come into being.

Thus the order of the [sublunary] world, the things generated by the gods down here, and their well-being are neither the primary purpose of their activity, nor do they issue from them without their knowledge and will. FWZ

[1] It is clear from the context that 'the remaining things' must be those of the sublunary world. 'God' in the singular, if not a change introduced by the Christian translator, here stands for the plural and refers to the 'divine' (celestial) world above the moon.

[2] Reading *al-sabab fî <anna>*.

[3] Reading *wujûd al-'inâya...<fa->huwa*.

[4] Reading *idh* instead of Ruland's *in*.

[5] Literally, 'the providence of something'.

[6] Strictly, the Arabic says 'know better than all [other] things [do]', which is not perhaps the sense intended.

[7] Reading an *<tuḥmiya wa-lâ>*, followed by forms of *aḥmâ* 'to heat' rather than Ruland's *aḥṣâ* 'to count' (cf. 69,4).

(9) Alexander(?) *Quaest.* 1.25, 41,4-12

These things being so, [then], if someone wanted to say that everything was an object of Providence which in any way possesses change and

movement on account of something and deriving from it, all corporeal being, both that which is eternal and that which is subject to coming-to-be and passing-away, would be an object of the Providence of the primary being, which is eternal and unmoved and incorporeal.

But if someone were to say that objects of Providence are only those things for the sake of which that which is said to exercise Providence over them performs certain activities in moving, [then] only the body which is below the moon would be an object of Providence according to Aristotle, and this is that which is enmattered and subject to coming-to-be and passing-away. RWS

(ii) Plotinus

Plotinus, though still denying omniscience, allows Providence to extend to individuals and to many details, in his treatise on Providence, 3.2-3 [47-8]. In this, he agrees with Plato *Laws* 10, 905A.

Plotinus also extends Providence, contrary to Alexander, to higher levels, 3.3 [48] 15 (15-17), translated under **4(b)**.

(iii) Proclus

Providence, and hence divine knowledge, extends to everything.

(10) Proclus *de Dec. Dub.* Boese Q. 2.6, translated in full under **3(a)**

It is not the purpose of the present discussion, then, to prove either of these two points, I mean that there is Providence for all things, and that contingency is not merely a word, but a nature belonging to beings. For our declared aim is this: we take for granted, as it were, that there is Providence and that it is of all the things which are considered beings, in order to solve the many difficult problems implied in this. JO

Providence also rules the intelligible world as well as the sensible (contrary to Alexander), Proclus *On Providence* 2.3; 3,13-14, translated under **4(b)**.

(iv) Does providence extend to crops?

On prayers for crops, see Iamblichus *Myst.* 5.17, translated in **Psychology 18(a)**. Simplicius thinks that Aristotle extends purpose in nature far enough to include rain falling (in Winter) to nourish the crops (so also Furley). But if rain (in Summer) rots the crops, this may occur by nature (*phusei*), but is not caused by nature for this purpose. At most, it might be caused by God exploiting an accident of nature.

(11) Simplicius *in Phys.* 374,18-28

So if the growth of the crops because of rain is natural and usual, it is clear that their growth because of the rain is not *per accidens*; therefore the rain

falls for a purpose, namely the growth of the crops, just as it falls for a number of other purposes which are not consequential on the rain *per accidens*; for the same event can occur for a variety of purposes, both major and minor. Does it then rain in order to rot the crop? No, for this is not one of the usual results consequential on the rain, but one of the less usual ones. And that is why even if it occurs by nature (*phusei*), it represents a failure on the part of nature to achieve its goals – just as freaks are. Unless, of course, the rain falls in order to rot the crops; but in that case it is not nature that causes the rain to fall for that purpose, but the creator god, who directs (*apeuthunein*) all things according to justice, exploiting nature. BF

Reading

David Furley, 'The rainfall example in *Physics* 2.8', in A. Gotthelf, ed., *Aristotle on Nature and Living Things. Studies Presented to David M. Balme*, Pittsburgh 1986, 177-82, reprinted in his *Cosmic Problems*, Cambridge 1989.

Philoponus disagrees. He sees the rain as part of a process which preserves the elements and which is not intended to preserve particular crops, although we can find beneficial results on the particular level.

(12) Philoponus *in Phys.* 312,23-313,9

'But as Zeus sends the rain not in order to increase the corn, but out of necessity.' [Aristotle *Phys.* 2.8, 198b17-19] So why do we say, 'the corn is increased *per accidens*, and the rain is not for the sake of anything but out of necessity, because what is borne up must be cooled, *tout court*?' And it is worth asking whether anything at all comes to be *per accidens* by Providence, or whether anything at all is harmed by Providence. So we say that with Providence managing the universe nothing comes to be by chance or as it happens, but everything for the sake of some good, and Providence does not produce anything *per accidens*. So the cosmic good exists in the rain too; for the movement in a circle of the elements comes about through the endurance and structure of the cosmos. For the self-sufficient bodies which possess endurance, these move in a circle – I mean the heavenly [spheres]. So in order that the elements, too, may endure they move in a circular movement, and because of this water [comes] out of earth, and out of water air, and out of these fire, and again air and water and earth; and the return is into the same thing out of which also they started, which is [the mark] of circular movement – the restoration out of the same things into the same thing. And it is possible to observe good on the particular level, for because of the fitness of each [of them] the things outside are disposed in this way or that by Providence. ARL

Themistius also thinks that rain has a purpose other than crops, but farmers make use of it.

(13) Themistius *in Phys.* 60,9-14

Zeus' rain [text corrupt] is not for making my grain grow. But does anything follow about it not being for anything? It does not follow that if it is not for my wheat, it is not for anything. Rather, the rain comes by nature first and foremost for something else, as you would gather in our later discussion of the cosmos. But farming puts this natural consequence to additional use. RRKS

Porphyry allows that good daemons may be in charge of crops and animals, bad daemons may damage them.

(14) Porphyry *Abst.* 2.38.2

All the souls which, having issued from the universal soul, administer large parts of the regions below the moon, resting on their *pneuma* but controlling it by reason, should be regarded as good daemons who do everything for the benefit of those they rule, whether they are in charge of certain animals, or of crops which have been assigned to them, or of what happens for the sake of these – showers of rain, moderate winds, fine weather, and the other things which work with them, and the balance of seasons within the year; or again, for our sake, they are in charge of skills, or of all kinds of education in the liberal arts, or of medicine and physical training and other such things. It is impossible for these daemons both to provide benefits and to cause harm to the same beings. GC

(15) Porphyry *Abst.* 2.40.1

One thing especially should be counted among the greatest harm done by the maleficent daemons: they are responsible for the sufferings that occur around the earth (plagues, crop failures, earthquakes, droughts and the like), but convince us that the responsibility lies with those who are responsible for just the opposite. They evade blame themselves: their primary concern is to do wrong without being detected. GC

For Iamblichus on ritual using material objects and addressed to material gods as obtaining protection of crops, see *Myst.* 5.17, translated in **Psychology 18(a)**.

(v) Does providence extend to *domestic* animals or all animals?

(16) Augustine *Enarr. in Psalmos* 145,13-14 (verse 6)

[13] And the apostle, too: 'Is God's concern really for oxen?' [1 Cor. 9.9]. So, on the one hand, 'God is not concerned with oxen' and on the other 'thou, Lord, shalt save both man and beast' [Psalm 35,7-8]. But don't they contradict each other? What does the apostle say? 'Is God's concern really for oxen?' There is a commandment here, 'Thou shalt not muzzle an ox

when it is treading out the grain' [Deut. 25.4 quoted at 1 Cor. 9.9]. Hasn't God taken thought for oxen here then? In which case it is only certain oxen in particular that he has referred to. No, this is not what concerns God – advising you what to do with your oxen. Human nature itself already takes care of this. Man is created to know how to take care of his beasts. Man hasn't been given commandments by God about this. Rather God has instilled in his mind the ability so to act – even without any commandment. God created man to be like this. But just as man rules over his cattle, so he ought to be ruled by someone else. And one receives the commandment from that by which one is ruled. As regards, therefore, the point and purport of the commandment, God is not 'concerned with oxen'. However, as regards his universal Providence, by which he created all things, and by which he rules the world, 'thou, Lord, shalt save both man and beast'.

[14] Dearly beloved, listen carefully! Suppose someone now says to me: 'Oxen are of no concern to God', this comes from the New Testament, but 'thou, Lord, shalt save both man and beast' comes from the Old. For there are those who spread the slander that the two Testaments do not agree with each other. What to do? How to stop him saying that there is one thing in the Old, and something else in the New? How to stop him demanding from me a statement from the New to the effect that 'thou, Lord, shalt save both man and beast'? Now, nothing is as much the heart of the New Testament as the Gospel. I find in the Gospel that all such things are of concern to God. Now there will be no one doing any contradicting. Can it be that the Apostle is opposed to the Gospel? Let us listen to the Lord himself, the head and teacher of the Apostles. 'Behold', he says, 'the fowls of the air: for they sow not, neither do they reap, nor gather into barns, and yet your heavenly Father feeds them' [Mt. 6.26]. So then, as well as man, these animals are of concern to God's care – but so that he feeds them, not so that he gives them the Law. As far, therefore, as regards giving them the Law, God does not 'care for oxen'. But as regards creating, feeding, governing and ruling all things, all things are of concern to God. 'Are not two sparrows sold for a farthing?' says the Lord Jesus Christ, 'and one of them shall not fall on the ground without your Father's will. How much more are you worth than many sparrows [Mt. 10.29,31]?' So do not say 'I am no concern of God's'. Your soul is God's concern. Your body is God's concern, because God created your soul and your body. Perhaps you say: 'In all this vast crowd, as regards God, I don't count'? This is where that astounding saying from the Gospel comes in: 'All the hairs of your head are numbered [Mt. 10.30]'. SH

(17) Boethius *in Int.*[2] 231,12-19

Nor must all things be snatched away by necessities. For in the genus of all animals, considered just as animals, one [sort] is subject to nature, another to the heavenly courses of the stars, still another to the mind's reason and the spirit's thought. For of trees and irrational animals, trees

are indeed subject to nature only, but cattle to decrees of heavenly bodies as well. Human beings, on the other hand, are subject to nature, to the stars, and to their own will. NK

Maimonides *Guide* 3.17 reports Aristotle and Alexander and replies that Providence extends to individuals only in the case of mankind, not in the case of animals.

Proclus extends Providence to all animals, provided they have a trace of life or soul.

(18) Proclus *de Dec. Dub.* Boese 7.43

Well then, let us drop our investigations of this problem, in order to turn to some related questions that are usually raised concerning beasts, and let us direct our attention to this seventh problem. If Providence extends to them, what to make of the inequality that reigns among them? For instance, some are doing fine, other are not; some are tormented by diseases, others live in good health. And other such differences set them apart from each other. On the other hand, in what does the equality consist that is to be found even among them, different as they may be? Indeed, we see that they too are afflicted by some common corruptions, as men are. And also in their case we must look for the cause of the events, since we are convinced that Providence extends as far as the lowest beings. We also have to examine their habit of devouring each other, and explore what can be the reason for this practice. For these are the three facts that raise doubt about the influence of Providence on them, namely the inequality of the situations in which they may find themselves, the corruptions which they too have in common, and the practice of mutual devourment. We will say something about that, but let us ascertain something else first. For either there is a trace (*vestigium*) of self-moving life in them too, separable from the body, or there is none at all, in which case any form of soul they possess is extinguished together with the body and can be reduced to qualities and innate heat. If we have settled these questions, we will have ample opportunity to show that the governance of Providence is manifest also in these creatures. JO

(vi) Augustine

We have seen Augustine's view that Providence extends to domestic animals. He rejects the view that only the heavens are subjects of Providence, *Gen. Lit.* 5.21.45. This relates to his view, illustrated in **8(f)**, that through the mechanism of unfolding seeds, God's Creation is still in process of taking place.

(19) Augustine *Gen. Lit.* 5.21.45 Zycha, *CSEL* 28, p. 165,8-14

Nor should we listen at all to those who have held that the highest parts of the universe are indeed governed by divine Providence, that is starting from the confines of our more corporeal air and going upwards, but that

this lowest part, which is earthy and fluid and consists of the air which is nearer to us, and flows with exhalations of earth and water, where winds and clouds rush together, is moved instead by chance and fortuitous movements. RRKS

Reading

Alexander on providence:

S. Fazzo, M. Zonta, *Alessandro di Afrodisia: La provvidenza. Questioni sulla provvidenza*, Milan 1999.

P. Moraux, *Alexandre d'Aphrodise: exégète de la noétique d'Aristote*, Liège & Paris 1942, 195-202.

H.-J. Ruland, *Die arabischen Fassungen zweier Schriften des Alexander von Aphrodisias, über die Vorsehung und über das liberum arbitrium*, diss. Saarbrücken 1976, also forthcoming annotated Italian translation by S. Fazzo and M. Zonta.

R.W. Sharples, 'Alexander of Aphrodisias on divine Providence: two problems', *Classical Quarterly* 32, 1982, 198-211, with bibliography.

R.W. Sharples, *Alexander of Aphrodisias: On Fate*, London 1983, 25-7.

R.W. Sharples, 'Alexander of Aphrodisias: scholasticism and innovation', in *Aufstieg und Niedergang der römischen Welt*, 2.36.2, 1987, 1176-1243 at 1216-18.

R.W. Sharples, 'Alexander of Aphrodisias and the end of Aristotelian theology', in T. Kobusch, M. Erler, eds, *Metaphysik und Religion: zur Signatur des Spätantiken Denkens*, Munich 2002, 1-21.

Proclus on providence:

See *Proclus: On the Existence of Evils*, trans. Carlos Steel and Jan Opsomer, *Ancient Commentators on Aristotle* ed. Richard Sorabji, London & Ithaca, NY, with bibliography.

4(b) Relation of providence to fate

According to the Neoplatonists, including Boethius, Fate is the working out of Providence in the temporal details of the lower world only, whereas Providence is directed, contrary to Alexander, to higher levels as well. The view that Fate is the carrying out of what Providence initiated is ascribed to Plato already in Apuleius *On Plato* 1.12. The Christian Nemesius ascribes to Plato the different view that Providence covers not only Fate, but more besides, including the choices we make, which are unfated, and up to us, *On the Nature of Man*, ch. 38, translated under **5(j)**. The Stoics disagreed with each other, Cleanthes denying that all that is fated is providential, as both Zeno (Aetius 1.27.5 = *SVF* 1.176) and Chrysippus (Calcidius *in Tim.* 144 = *SVF* 2.933) seem to have argued. For the Neoplatonist view see:

(1) Plotinus 3.3 [48] 5 (14-16)

But one thing results from all, and Providence is one, but Providence is Fate beginning from the inferior level, whereas the upper level is Providence only. RRKS

(2) Proclus *in Tim.* 3.273,9-12

For being dependent on the Providence of the gods and the goodness of the Demiurge, it [Fate] is given unity and directed by it, being a *logos* composed

of *logoi*, a single multi-faceted power, a divine life, and the order that precedes ordered things. HT

(3) Proclus *Prov.* 2.3, lines 6-9 Boese

But Providence pre-exists Fate and indeed all that happens in accordance with Fate happens much before that from Providence, whereas the contrary is not true. For the highest of all things are more divine than Fate and are ruled by Providence. RRKS

(4) Proclus *Prov.* 3.13, lines 5-12 Boese

Next Providence, which stands above all intelligibles and sensibles, is superior to Fate. Things which persist under Fate persist under Providence too. Their remaining intact they owe to Fate, but their flourishing to Providence, so that their staying intact should have their flourishing as its goal and Providence should be <desired> by Fate. But things that in turn are under Providence do not all still need Fate as well: Intelligibles are exempt from Fate. Where could Fate be at all in incorporeals, if indeed Fate introduces the need to stay intact and time and corporeal movement as well? RRKS

(5) Proclus *Prov.* 3.14, lines 1-5 Boese

So you should understand there are two kinds, the one intelligibles, the other sensibles, and there are two kingdoms for the two, that of Providence being above over both intelligibles and sensibles, that of Fate below over sensibles. Providence differs from Fate in the way that God differs from what is divine, not directly but through participating in divinity. RRKS

(6) Boethius *Consolation* 4, prose 6, sections 7-14 Bieler, *CCL* 94

[7] Then, as if making a fresh start, she spoke as follows: 'All coming-to-be of things, all development of natural things subject to change, and whatever is in movement in any way at all derives its causes, order and forms from the permanence of the divine mind. [8] This, settled in the citadel of its own singleness, has laid down a complex rule for the things that come about. When this rule is considered in the context of the very purity of the divine intelligence, it is named Providence; but when it is referred to those things which it sets in motion and arranges, it has been called Fate by the ancients. [9] That these are different will be easily apparent, if one considers in his mind the power of each; for Providence is that very divine reason established in the highest ruler of all, which arranges all things, but Fate is the arrangement present in things subject to movement, through which Providence binds each thing in its own proper order. [10] For Providence embraces all things, however diverse and however infinite; but Fate ar-

ranges individual things, in their movement distributed as to places, forms and times, so that this whole temporal unfolding, when united in the view of the divine mind, is Providence, but the same uniting of things, when arranged and unfolded in time, is called Fate.

[11] Although these are different, one depends on the other; for the sequence of Fate proceeds from the singleness of Providence. [12] For just as the craftsman grasps the form of the thing to be made in his mind first and sets the realisation of the work in motion, carrying out in temporal sequence what he had foreseen in singleness and in present time, just so God by his Providence arranges in a single and fixed way the things that are to be brought about, but by Fate he manages, in their plurality and in time, these very same things which he arranged. [13] So, whether Fate is carried by certain divine spirits which are servants of Providence, or whether the sequence of Fate is woven together through the service of the world-soul or the whole of nature, or by movements of the heavenly bodies or by the power of angels or by the varied offices of daemons, by some of these things or by all of them, what at any rate is certain is that the unmoved and single pattern of things that come about is Providence, while Fate is the moving connection and sequence in time of the things whose coming-about has been arranged by the divine simplicity.

[14] Thus it comes about that all things which are subject to Fate are also subject to Providence, to which Fate itself is subordinate; but certain things which are situated subject to Providence rise above the ordering of Fate. These are those which, close to the first divinity, are firmly fixed and are outside the sequence of movement subject to Fate.' RWS

(7) Hierocles *On Providence* in Photius *Biblioth.* vol. 7, p. 192 Henry, translated below under **5(g)**

Further evidence is assembled by I. Hadot, pp. 129-30, from Iamblichus' *Letter to Macedonius* in Stobaeus vol. 2, p.174, 1ff. Wachsmuth; Sallustius *On the Gods* 9.4; Hierocles *On Providence* in Photius vol. 7, p. 199 Henry; Olympiodorus *in Gorg.* 198,9 Westerink.

Reading

I. Hadot, *Le Problème du Néoplatonisme Alexandrin: Hiéroclès et Simplicius*, Paris 1978, ch. 6.

Augustine thinks that Stoic Fate differs only verbally from God's will.

(8) Augustine *City of God* 5.8 Dombart and Kalb, *CCL* 47, p. 135,1-136,35

We should not labour much to contend in a verbal controversy with those who give the name of Fate not to the arrangement of the stars, as it is when something is conceived, or born, or begins, but to the connexion and series of all causes by which everything comes about that does come about. For they attribute that very order and particular connexion to the will and

power of the highest God, who is admirably and absolutely correctly believed to know everything before it happens and to leave nothing unordered. From him come all powers, though not the wills of all. That they give the name of Fate chiefly to that very will of the highest God, whose power extends invincibly through all things, is proved as follows – these verses if I am not mistaken, are by Annaeus Seneca [in fact translated in Seneca *Ep.* 107 from the Stoic Cleanthes]:

'Lead wherever you choose, highest Father and ruler of the high heaven; obedience is without delay. I am eagerly present. Suppose I am unwilling, I shall follow with groans and will suffer as a scoundrel what I might have done as a good man. The Fates lead the willing; they drag the unwilling'.

Surely it is most evident that in this last line he [Seneca] gives the name of Fates to what above he had called the will of the highest Father, whom he says he is ready to obey, to be led willingly, so that he should not be dragged unwilling, since:

'The Fates lead the willing; they drag the unwilling'.

Those verses of Homer which Cicero turned into Latin also testify to this opinion.

'The views of men are such as the light with which Father Jupiter himself brightened the fruitful lands'.

A poet's opinion would have no authority on this question. But since [Cicero] says that the Stoics are in the habit of using those verses of Homer to assert the power of Fate, the discussion concerns the opinion not of that poet, but of those philosophers. What they think Fate is is most clearly manifested through those verses which they apply to their dispute about Fate, for they call it Jupiter, whom they consider the highest God, and from whom they say the links of Fate depend. RRKS

4(c) Relation of providence to chance

Boethius takes over Aristotle's conception of chance as the coincidence of two outcomes, each explicable separately. On Aristotle's view, the conjunction itself has no explanation, but Boethius changes this, making providence the explanation. Contrast Alexander(?), who divorces providence from accidental conjunctions. The effects of providence down here are not accidental, says Alexander(?), because though not the primary purpose, they are foreseen and welcomed. Contrast also the treatment of evil as accidental in Plotinus and Proclus under **4(e)**.

(1) Alexander(?) *Quaest.* 2.21, 66,17-68,19

And I [said], 'It seems to me that it will be clear whether this is so or not, if we first remind ourselves what each of these indicates, I mean "*per se*" and "accidental".' He said that what I was saying was right, and I tried to set out what is indicated by each of the [terms] assumed in the question. I said that the person who is said to exercise forethought concerning something *per se* is the person who makes his end the benefit of the object of his forethought, and performs, for the sake of this, those actions through which

he thinks he will achieve the goal that is his objective, making the end of his activities the benefit of the object of his forethought. 'Somebody is said to exercise forethought concerning something accidentally, however', [I went on,] 'when the person who is said to exercise forethought in this way does nothing for the benefit of the object of forethought, but it happens as a result of some of the things brought about that it receives some benefit, the person who exercises forethought in this way not even being aware of the result in the first place. For the man who is thought to have found a treasure accidentally is the one who first dug for some other reason, not expecting to find [the treasure]; and someone was killed by a thunderbolt accidentally because the thunderbolt did not hurtle [downwards] for this reason, and no thought that this would happen occurred to the maker, or perhaps the Craftsman, of the thunderbolt. For knowledge of some one of the things that will follow on things that come about for some other reason removes the accidental [quality of their] coming about, since what is accidental is what is thought to come about contrary to rational [expectation], while foreknowledge is thought to be a sign of things that come about in accordance with reason. Or is it not to these things and those that come about in this way that we apply "accidental"?'

[67,3] And he [said], 'No, not to anything else. At any rate, when we say that luck is a cause *per accidens*, we define it no less by [its being] unforeseen than by its occurring infrequently.'

[67,6] 'Well', I said, 'if forethought that is *per se* and that which is accidental are like this, I do not think you will need many more arguments in order to think that the question, which demands that providence be divided into that which is *per se* and that which is accidental, only, is not adequate.'

[67,10] 'What you say is right', he said; 'for if someone is aware of the benefit that will be brought about for someone from the things that he himself brings about for some other reason, it is clear from what has been said already that it is neither *per se* nor accidentally that this man exercises forethought concerning the one who receives benefit in this way from some one of the things which he [himself] brings about.'

[67,14] 'What', I said, 'if, in addition to [his] being aware of the benefit that is brought about for someone, it is also brought about in accordance with his own wish? Will you not say that forethought that comes about in this way is much further still removed from that which is accidental?'

[67,17] And he [replied] 'Yes, certainly. I suppose that [forethought] that comes about in this way <is neither *per se* nor accidental; for> to exercise forethought for something *per se* is to do everything for the sake of the object of the forethought, while to do so accidentally is to act for the sake of something else without even being aware of the benefit that comes about for [the object of one's accidental forethought] through that, and not wishing [it] either. But what does not act for the sake of [the object of forethought], while yet being aware of and wishing the benefit to it, will

exercise forethought concerning it, but will not do so either *per se* or accidentally. ...

[68,5] 'How about this?' I said. 'Suppose someone says that forethought in one respect comes about *per se* and in another accidentally, and that [it does so] *per se* for universals, but accidentally for the things that fall under them. Isn't he too speaking of some other type of forethought besides those mentioned at the beginning?'

[68,9] 'Yes of course', he said, 'if what is common is other than each of the things that fall under it, but having in these its being some one thing, and on account of this in a way sharing with them the things that come about primarily with a view to itself'.

[68,12] And I said to him, 'So it is clear from what has been agreed, that in whichever of the ways stated subsequently [i.e. after the original dilemma] one says Providence and forethought comes about, one will be saying that it does so neither in a primary way nor accidentally'.

[68,15] 'Yes, it's clear', he said.

'But', I said, 'since this has become clear it is clear both that the first question which you said some people ask does not deserve an answer, and also that the person who says that Providence comes about in some one of these ways does not do away with Providence, as the person who says that it comes about accidentally seems to do. RWS

(2) Alexander *Prov.* 63, translated under **4(a)**

(3) Boethius *Consolation* 5, prose 1, sections 12-19 Bieler, *CCL* 94

[12] 'My Aristotle,' she said, 'defined this [chance] in his *Physics* in an account that is both short and close to the truth.'

'How?' I said.

[13] 'Whenever something is being done for the sake of anything,' she said, 'and for certain reasons something other than what was intended happens, this is called chance (*casus*). For example, if someone were to dig the ground in order to cultivate a field, and discovered a quantity of buried gold. [14] This then is believed to happen fortuitously (*fortuitu*), but it does not come from nothing; for it has its own proper causes, the unforeseen and unexpected coincidence of which appears to have produced the chance result. [15] For if the cultivator were not digging the ground, or if the person who hid his money had not buried it at that precise point, the gold would not have been found. [16] So these are causes of the fortuitous gain, which results from causes which met each other and came together, not from the intention of the agent. [17] For neither the man who buried the gold nor the man who tilled the field had the intention that that money should be found, but, as I said, it happened coincidentally that the one dug where the other had buried it. [18] So chance may be defined as an unexpected outcome, as the result of causes that come together, in these things that are being done for the sake of something. [19] But the coinci-

dence and coming together of causes is brought about by that order, advancing by unavoidable connections, which descends from Providence as its source and arranges all things in their proper times and places. RWS

See also above, Philoponus *in Phys.* 312,22-313,9, under **4(a)**.

Reading
E. Reiss, *Boethius*, Boston 1982, 152.
Richard Sorabji, *Necessity, Cause and Blame*, London 1980, ch. 1.
R.W. Sharples, *Cicero: On Fate and Boethius: Consolation*, Warminster 1991, 215.

4(d) Relation of providence to nature

See above **4(a)(iv)** on providence and crops, where Simplicius disagrees with Themistius and Philoponus on whether natural rainfall is for the sake of crops, but allows that God's providence could exploit unseasonable rain to rot the crops. See also **1(b)**. And see the next section, **4(e)**, for Proclus on evil as not in accordance with nature, but used for the good of the whole. Aristotle is said in the quotation from Nemesius that follows to *substitute* nature for Providence (at least below the heavens).

(1) Nemesius *Nature of Man* 43, 127,12-21 Morani

So let us reserve for the proper occasions the refutation of these philosophers and proceed to the view of Aristotle and the others who deny that there is a special providence.

Aristotle maintains that particular affairs are controlled by nature alone, as he hinted in Book 6 of the *Nicomachean Ethics*; for nature is divine and, being present in everything that comes to be, it naturally prompts the choice of the advantageous and avoidance of the harmful. For, as has been said, each animal selects the food suited to it and searches for the advantageous, and naturally knows the remedies of its ills. JOU

4(e) Problems of evil

How can there be evil in a providential world? Plato, as so often, set the problem, without bequeathing to his commentators any one solution. In three places, he insists that God is not responsible (*anaitios*) for evil, *Timaeus* 42D; *Republic* 2, 379C; *Republic* 10, 617E. In the last passage, he exonerates God from causing sin by the device of letting souls choose their next incarnation. As for responsibility for imperfections other than human action, Plato blames the recalcitrance of matter in the *Timaeus*, e.g. 75A. Again, at *Theaetetus* 176A6, he suggests that good needs evil as its contrary.

Aristotle's ideas on chance and on anomalies in nature came to be exploited, we shall see, as solutions. Aristotle further argues in *Metaphysics* 9, 1051a17-21, that evil does not exist (like Platonic Forms) apart from individual things, and that there is no evil among the principles of the universe (such as the Indefinite Dyad, postulated orally by Plato in his lecture on the Good, *ap.* Aristotelem, *Metaph.* 13.6-7, or the evil soul which some Platonists detected in Plato's universe).

But for Aristotelians the problem was less acute, because they took it that

Aristotle would deny that God's providence concerned itself with individuals in the world beneath the heavens; see under **4(a)**. The Epicureans were more extreme and denied that the gods had any concern with the world at all. By contrast, Plato *Laws* 905A and Plotinus in his treatise on providence 3.2-3 [47-8], extend providence to many individual things. But Plotinus still denies the gods have knowledge of every detail, as shown under **3(a)**. Proclus, by contrast, makes deity omniscient; see again **3(a)**.

The Stoics' deity knows all things (but see Cicero *ND* 2.167; Plutarch *St. Rep.* 1051C on his neglect of small things). They regarded vice as the only genuine evil, but still sought to explain other apparent imperfections. They therefore needed an explanation of these imperfections as well as of genuine evil. They sometimes sought to deny that local evil was really evil in the universe taken as a whole. For example, they sometimes said (Plutarch *Com. Not.* 1065D-E; Marcus Aurelius 6.42, both in *SVF* 2.1181), that evil is needed for the whole, as a mixture of black and white or of high and low notes is needed in the visual arts and music. The Platonist Plutarch of Chaeroneia, followed by Augustine, endorsed this. The Stoics also made a suggestion which we shall see revived later, that evil is an accidental effect, *On the Generation of Soul* 1015B-C. Plutarch, however, rejects this.

As regards the explanation of evil detected in Plato by some Middle Platonists, that it is due to the existence of an evil power, Numenius exploited Plato's Indefinite Dyad as an evil force. Plutarch claims, inaccurately, that Plato in *Laws* 896E; 897B; 897D; 898C postulates an evil soul, which Plutarch takes to be responsible for pre-cosmic disorder, *On Isis and Osiris* 370F; *On the Generation of Soul in the Timaeus* 1014D-E; 1015E, and to retain some such tendency even after its combination with Intellect to form the cosmic World Soul, since, *On the Generation of Soul* 1024D, it is connected with the Difference and Divisibility that *Timaeus* 35A locates in the World Soul. Atticus agrees that Plato postulates an evil soul, *ap.* Proclum *in Tim.* 1.381,26-382,12; 1,391,6-12.

(1) Plutarch *On Tranquillity* 474A-B

Nothing in human affairs is pure and unmixed. But just as in music there are high and low notes, and in grammar there are vowels and consonants, yet the musician or the grammarian is not the one who out of dislike avoids one or the other but rather is the person who knows to use them all and blend them for his proper purpose, likewise in the case of [human] affairs which involve their opposites – for as Euripides says, 'The good and the bad could not occur separately, but there is some blending, so that the result is fine' – we should not be discouraged by one side and give up hope, but like musicians using the better to take the edge off of the worse and encompassing the bad with the good we should make the blending of our life harmonious and congruous with our own nature. JO

(2) Augustine *City of God* 11.23 Dombart and Kalb, *CCL* 48, p. 342, 28-30

Just as a picture is beautiful with black in its right place, so the whole universe, if anyone could see it, is beautiful even with sinners. RRKS

Plotinus borrows many ideas from the Stoics, but a central idea will be studied in the next section, that matter is, or is the source of, evil, 1.8, and this idea is derived

especially from Plato's *Timaeus* and from Alexander. The idea facilitates another one stressed in 1.9, that evil is a non-being, and matter as prime matter, the ultimate subject of properties, is like a shadow, the point at which light fails to produce anything (4.3 [27] 9 (21ff.); 1.8 [51] 7 (17ff.)). Plotinus at 1.8 [51] 7 stresses that such a shadow is inevitable, and at 1.8 [51] 3 that the intelligible world, consisting as it does of real being, cannot contain evil.

(3) Plotinus 1.8 [51] 5 (5-9)

Evil consists in deficiency (*elleipsis*) not of any sort, but in total deficiency. For what is slightly deficient in good is not evil, since it can even be perfect relative to its own nature. But when there is total deficiency, which is what matter is, that is really evil, having no share of the good. RRKS

(4) Plotinus 1.8 [51] 3 (1-6)

If this is the nature of real Beings and what lies beyond them, no evil could exist among real Beings or what lies beyond them. So the only alternative, if there is evil, is that it is to be found among non-Beings, is a sort of species of non-Being, and is to do with whatever mixes or in some way communicates with non-Being. BF

(5) Plotinus 1.8 [51] 7 (16-23)

It is possible to grasp the necessity of evil in this way, too. Since not only the good [exists], it is necessary that the [process of] going out past it, or, if one wants to put it this way, the continual descent and departure, should have [some] last [point]; and that [point] after which it is no longer possible for anything to come to be, is evil. It is through necessity that what comes after the First exists, and hence that what is last does so; and this is matter, which no longer possesses anything of [the good]. And this is [how] evil is necessary. RWS

But if it is matter that is evil, Plotinus must avoid the conclusion that evil is possessed by the higher causes of matter. He meets this problem by saying that what is harmonious at a higher level of reality, like the ingredients in a seed, may be inevitably unharmonious when realised at a lower level, 3.2 [47] 2 (16-31). Similarly, evil can result from a combination of goods 4.4 [28] 39 (27-9). It is stressed in 4.4 [28] 41 (9-12); 4.4 [28] 39 (23-6), the first translated under **6(k)**, that the physical harm which comes to people is not intended. When good people are physically harmed, 4.3 [27] 16 (6-9), this is not a natural outcome, nor a principal (*proêgoumenon*, a Stoic term) objective, but something that merely follows (*hepesthai*). These ideas bring us closer to Proclus' view of evil as an unintended and unnatural parasitic outcome (*parupostasis)* analogous to Aristotle's coincidences.

(6) Plotinus 3.2 [47] 2 (16-31)

What flows out from Intellect is Reason (*logos*), and it always flows out, for

as long as Intellect is present among the things that are. But it is as when in the rational formula (*logos*) in a seed all [the parts] are together and in the same place, and none conflicts with another or is at variance with it or obstructs it; but when [the creature] acquires bulk, different parts are in different places, and one might hinder another or even consume it. So this whole universe arose from a single Intellect and from the Reason which comes from it and was separated, and of necessity some things were friendly and kind to one another while others were hostile and at war, and some willingly, some even unwillingly injured each other; and different things, perishing, brought about the coming-to-be of one another. And as they acted and were acted upon in such ways they began a single harmony applying to them all, each producing their own sounds, but Reason creating a harmony and a single ordering of them all in relation to the whole. RWS

(7) Plotinus 4.3 [27] 16 (6-9)

These [harms] do not correspond to the rational principles of nature, nor were they among the principal (*proêgoumena*) [objectives], but rather were consequences of those. For example, if a building falls, the man who falls under it is killed, whatever sort of man he is. RRKS

(8) Plotinus 4.4 [28] 39 (23-32)

If this is the correct account, then the problems are resolved. In reply to the suggestion that evil is the gift of the gods, it should be realised that (a) there are no active choices in operation; whatever is derived from above is the result of natural necessity of parts in relation to each other, the outcome of the life of a unity, (b) each part contributes much to the process, (c) in the combination of contributions from donors none of whom are evil something untoward can emerge, (d) life exists not for the sake of the individual but for that of the whole, (e) the underlying matter receives one thing but experiences another, and has no control over what it is given. BF

In the last passage, 4.4 [28] 39 (23-32), Plotinus uses the very Stoic point that things are not for the sake of the individual, but for the sake of the whole, and with this Proclus agrees. Under **1(h)** we saw Chrysippus, Philoponus and Proclus using the idea of anomalies being contrary to individual natures, but not to nature as a whole, Proclus *On the Existence of Evils* 27,11-7 Boese = 27,15-24 D. Isaac.

(9) Plotinus 4.4 [28] 39 (29-30)

Life exists not for the sake of the individual but for that of the whole. BF

(10) Plotinus 4.4 [28] 32 (35-51)

One thing damages another to further its own interests; in fact one thing

feeds on another which is at one and the same time akin and different; each thing pursues its natural interests and appropriates from its neighbour whatever is to its own advantage, and wantonly destroys whatever is against it. In performing its proper functions each thing helps whatever is able to benefit from those functions, but destroys or harms whatever cannot withstand its force – just as fire scorches anything in its path, or large animals push aside or trample smaller ones as they stampede. The coming into being and the passing away of all these things and their alteration for better or worse perfect the uninhibited natural life of this single living creature, since it is not possible for its parts to exist in isolation, nor could the final end in sight be their partial existence, but the totality of which they are parts – parts which are different and do not all have their being permanently in a single life. BF

(11) Proclus *On the Existence of Evils* 60,1-4 Boese

But how is the evil inherent in bodies at the same time good? Is it because it is according to nature for the whole, but contrary to nature for the part? Or rather, is it even for the part according to nature insofar as it operates for the benefit of the whole, and contrary to nature when cut from the whole? CS, JO

(12) Proclus *On the Existence of Evils* 41,23-5 Boese

Indeed, for evils the indeterminate is due to partial causes, and limit to universal causes. Therefore, for particular things evil is real evil, but for wholes it is not evil. CS, JO

Plotinus also argues that better things, for example Providence itself, actually require the worse. Simplicius *in Cael.* 1, 361,1-364,14 (Latin) similarly quotes Plato *Theaetetus* 176A against Alexander, to show that in the sensible world, good requires evil.

(13) Plotinus 3.3 [48] 7 (1-8)

And because [there are] better things, [there are] also worse ones. For how could there be anything worse in a varied thing if there was not something better, or how [could there be something] better if [there was not] something worse? So one should not blame what is worse within what is better, but accept what is better, because it has given [something] of itself to what is worse. In general, those who seek to do away with what is worse in the universe are doing away with Providence itself. For what will it apply to? Not to itself or to what is better, for even when we call it 'Providence above' we are speaking [of it] in relation to what is below. RWS

(14) Simplicius *in Cael.* 363,4-11

Consequently, God would not wish evils to perish, since he would thus also wish the goods opposed to them to perish and he himself no longer to be the cause of all goodness. But if someone were to say, "what is there to prevent these goods from being while evils do not exist?", he would not realise that these things were no longer goods. For there would not be human justice and temperance if it were not possible for them to be transformed into their privations by being worn down, nor would there be health among the elements of animals if they could not also grow sick. RJH

Proclus strongly disagrees with Plotinus and offers a detailed reply.. We shall see in the next section that he rejects Plotinus' close connexion between matter and evil. The opening of *On the Existence of Evils* denies any equation of evil with non-being. This might be taken to be no more than an affirmation of its reality. But the point emphasised is that evil is *more* opposed than is non-existence to the good, as is shown by suicides preferring non-existence to suffering evil, 3,7-8 Boese, and by the fact that non-being, as a mere privation, cannot oppose anything, 38,35-41 Boese.

(15) Proclus *On the Existence of Evils* 3,6-11 Boese

Evil is further removed from the Good than non-being. This is what is shown by those who give priority to non-being over being evil. However, that which is further removed from the Good, is more unsubstantial than that which is closer; thus, that which is absolutely not, has more being than the so-called evil; therefore evil is much more deprived of being than that which is absolutely not. CS, JO

(16) Proclus *On the Existence of Evils* 38,25-30 Boese

If evil is contrary to the good and discordant with it, but privation neither opposes the disposition of which it is the privation, nor is disposed to do anything, since they say that its being is altogether weak and unstable, how would we still refer the cause of evil to privation of which all activity is denied? CS, JO

The true account of evil, according to Proclus, is that it is something parasitic (a *parupostasis*) on the good. The idea is first applied to evil by Iamblichus *ap.* Simplicium *in Cat.* 418,3-6 (for another context, see Syrianus *in Metaph.* 91,30, translated under **Psychology 3(j)** and **Logic and Metaphysics 5(c)**). Steel and Opsomer have shown how far Proclus' account of the parasitic draws on Aristotle's account of coincidences in *Physics* 2.4-6 and *Metaphysics* 6.3, on which see **5(f)**. According to Aristotle, chance outcomes are not due to intention or nature. They have only accidental causes, and there is no one type of cause, but an indeterminate or indefinite variety, that can bring about a type of coincidence. Finally, in *Metaph.* 6.3, I have argued, though not in *Phys.* 2, Aristotle clarifies that these accidental causes are not real causes, because a coincidence lacks explanation.

These ideas help Proclus to argue that evil is not to be found in higher causes,

because the parasitic does not have proper causes. In *On the Existence of Evils* 50, in the Latin version of William of Moerbeke as clarified by the Greek paraphrase of Isaac Comnenus (distinct from the modern Budé editor D. Isaac), Proclus says that evil is not produced in accordance with nature (50,7; 50,24 Boese, also 64,2 D. Isaac in Greek of Isaac Comnenus corresponding to Latin 51; also *in Tim.* 3,303,18), nor is it intended (*askopos* 50,30). The cause is indefinite (48,12-17; 50,24-5; 50,30-1; 51,22-6 Boese). Indeed, in a way there is no cause (*anaition pôs* 50,31 Boese). It receives its being by accident (*kata sumbebêkos*) and not from a cause that belongs to it (*oikeia aitia* 50,10-11 Boese). Being parasitic (a *parupostasis*) is contrasted with having a principal (*proêgoumenê*) cause and being a principal outcome, these being Stoic terms (49,7-8 ; 50,4; 50,26; 50,34 Boese; *in Tim.* 3,303,17; *in Remp.* 1,38,23-4; cf. Simplicius *On Epictetus' Handbook* ch. 35, 329,18ff.; 343; 506ff. Hadot; Simplicius *in Cat.* 416,32; 418,17).

We saw above under **1(g)** the comparable idea in Themistius and Simplicius that anomalies cannot be treated as *in accordance with* (*kata*) nature, although they could be said to happen *by* nature (*phusei*). But as regards evil, Simplicius says that it is a *parupostasis contrary* (*para*) to nature, *in Cat.* 416,3-418,17.

Not everything matches Aristotle's account of coincidences, not, for example, the description at the end of ch. 50 of the cause of evil producing evil through its own weakness. Moreover, Proclus adds a further idea, that evil derives its power and form from the good, which he illustrates in several ways. Injustice derives its power from people being just, disease depends for its power on the body working, and evil in humans consists in going against reason, in animals against nature. The last idea is anticipated by Augustine *Against Julian* 4.5.35. See Proclus *On the Existence of Evils* 52,2-22; 55,4-10 Boese.

Proclus is able to argue that his account denies neither the universality of Providence like the Aristotelians and Epicureans, nor the reality of evil, a view towards which Plotinus was sometimes drawn. Moreover, the higher causes are responsible only for the good aspects on which evil draws *On the Existence of Evils* 61,16-17.

(17) Simplicius *in Cat.* 418,3-6

What reason, therefore, can one give for such a disposition of these godlike men, and for the fact that not even Iamblichus objected to it, although he laid out many and excellent reasons why we ought to regard the bad [as consisting] in being parasitic (*parupostasis*) and failure (*apotukhia*)? RG

(18) Proclus *On the Existence of Evils* 50,1-41 Boese

[50,1] We must next consider what the mode of evil is and how it comes into existence from the above-mentioned causes and non-causes. Here we have to bring in the aforementioned parasitic existence (*parupostasis*). For there is no other way of existing for that which neither is produced, in any way whatever, from a principal (*proêgoumenê*) cause, nor has a relation to a definite goal and a final cause, nor has received in its own right an entry into being, since anything whatever that exists properly must come from a cause in accordance with nature (*kata phusin*) – indeed, without a cause it is impossible for anything to come about – and must relate the order of its coming about to some goal.

[50,9] In which class of things should we place evil? It would belong to the beings that have their being accidentally (*kata sumbebêkos*) and on account of something else, and not from a principle of their own, would it not? For we do everything and are active in our own right for the sake of participation in the good, gazing on it, and, as it were, being in labour for it and always desiring it. The result of our actions is in some respect right, and in another not right: in so far as we consider what is not good as good, it is not right; but in so far as we endeavour to obtain the good through our action, it is right. We are also right in so far as we envisage the good in its universality, but as considering the good in particular, we are wrong. What is desirable to us is thus something other than that which happens and which is attained, the first being the good, the latter the contrary.

[50,18] Therefore, if generation of the contrary takes place, in whichever way this comes about, on account of the weakness of the agent or on account of the incommensurability with that which actually happens, would we be right in saying that it exists rather than that it exists parasitically upon what happens? Or is it not rather the case that existence belongs to those beings that proceed from causes towards a goal, but parasitic existence to beings that neither appear through causes in accordance with nature, nor have a definite end? Evils, then, do not have a principal cause for their generation, a so-called efficient cause – for neither is nature the cause of what happens contrary to nature, nor is reason the cause of what happens contrary to reason – nor do evils attain the final goal, that for the sake of which everything that comes about exists. Therefore it is appropriate to call such generation a parasitic existence, being imperfect and not intended (*askopos*), uncaused in a way (*anaition pôs*) and indefinite (*aoriston*). For neither is there one cause for it, nor does that which is a cause in its own right and a principal cause produce effects for the sake of evil itself and the nature of evil, nor [is this the case for] that which is not a cause in its own right nor a principal cause. No, it is the exact opposite: everything that is produced, is produced for the sake of the good; but evil, coming from outside and being adventitious (*epeisodiôdês*), consists in the non-attainment of that which is the appropriate goal of each thing. The non-attainment is due to the weakness of the agent, since the agent has received a nature of such a kind that a part of it is better, a part worse, each part being separate from the other. For where the One is, there at the same time is the Good. But evil is – and the One is not – present in a split nature. For incommensurability, disharmony and contrariety are in multitude; and from these weakness and indigence proceed. CS, JO

(19) Proclus *On the Existence of Evils* 48,16-20 Boese

Hence, the efficient causes of evils are not reasons and powers, but lack of power, weakness, and a discordant communion and mixture of dissimilar things. Nor are they some immobile paradigms that always remain the

same, but rather such as are unlimited and indeterminate, and borne along in other things, unlimited things that is. CS, JO

(20) Proclus *On the Existence of Evils* 52,2-22 Boese

Evil is indeed privation, though not complete privation. For being coexistent with the very disposition of which it is privation, it not only weakens this disposition by its presence, but also derives power and form from it. Hence, whereas privations of forms, being complete privations, are mere absences of dispositions, and do not actively oppose them, privations of goods actively oppose the corresponding dispositions, and are in a certain respect contrary to them. For they are not altogether impotent and inefficacious; no, they are both coexistent with their power, and, as it were, led by them to form and activity.

[52,10] Plato too acknowledged this, when he said that on its own injustice is weak and inactive, but that it derives power from the presence of justice and is led towards activity, no longer abiding in its own nature nor in mere lifelessness, because that which brings forth injustice, being vital, imparts to evil as well a participation in life. All life, however, is essentially power. And when evil has established itself in a power that belongs to something else, evil is contrary to the good, and it uses the power proper to the latter in order to combat it. And the stronger the power is that inheres in evil, the greater are the actions and works of evil, and the weaker its power, the more meagre its actions and works. In fact, even in bodies the activity contrary to their nature (*preter naturam*) ceases proportionally to their physical powers, although when order is entirely dissolved what is contrary to nature exists in greater degree. Hence, in souls, too, greater effects are produced from lesser vices, and less from greater. CS, JO

(21) Proclus *On the Existence of Evils* 55,6-15 Boese

Now for the soul that is above, the good consists in being according to intellect – because intellect is prior to it. For the irrational soul it consists in being according to reason – because for each thing being good comes from that which is proximately better. And for the body again it is being in accordance with nature, because nature is the principle of motion and rest for it. If this is the case, it is necessary that evil for the first is being contrary to intellect, as being subcontrary to what is according to intellect; for the second it is being contrary to reason, as in its case being good means being according to reason; and for the third it is being contrary to nature. These three species of evil inhere in the three natures that are liable to weaken because of the decline into partial being. CS, JO

(22) Proclus *in Tim.* 3.303,15-19

It is clear, then, that evil has its being from a partial cause. In what way [does it have its being]: as a principal being (*proêgoumenê hupostasis*)? In no way, for things that have their being in this way are determinate (*hôristai*) and have a goal (*telos*) and conform to the nature (*kata phusin*) of what generated them. So it is parasitically (*kata parupostasin*) that evil is implanted in souls. RRKS

(23) Simplicius *in Cat.* 416,29-417,1

For if the contraries tend to be equipollent and equally primary (*proêgoumena*) and both according to nature, but *these* ones – I mean the bad and injustice and sickness and suchlike – are rather failures, deviations and perversions away from what is according to nature, and parasitic existences (*parupostaseis*), how could both [contraries] be of primary importance or equipollent or equally according to nature? For if there is such a thing at all as the counternatural (*para phusin*), it is to be found in these things and not in anything else. RG

(24) Proclus *On the Existence of Evils* 61,16-17 Boese

Now, if we are right in stating this, all things will be from Providence *and* evil has its place among beings. Therefore the gods also produce evil, but *qua* good. CS,JO

Insofar as Proclus treats evil as analogous to Aristotle's uncaused coincidences, he treats coincidences in an opposite way from Boethius. For Boethius in *Consolation* 5.1, prose, thinking of lucky coincidences, sees them as the good gift of divine Providence and as explained by Providence (see above under **4(c)**).

Neoplatonist ideas on evil reached Christianity by more than one route. Augustine read Plotinus and in *Confessions* 3.7; *City of God* 11.9; 11.22, he calls evil merely a privation of good. Boethius, *Consolation* 4.2, in the same tradition, calls evil an absence of power. In *City of God* 12.6-7; 12.9, Augustine sees perverted will as the source of misery, but denies that there is any cause of the will turning in the wrong direction.

The notion of *parupostasis* had been applied to evil by earlier Christians, Gregory of Nyssa (c. 335-394) and John Chrysostom (died 407). But by far the most important Christian source, which made Proclus' views the best known, was the unidentified Christian pseudo-Dionysius, who soon afterwards plagiarised the ideas of Proclus (AD 411-484) and successfully passed them off as the work of St Paul's disciple Dionysius (Denys) from the first century AD. In the case of Proclus' treatise *On the Existence of Evils*, which pseudo-Dionysius incorporated as a Digression on Evil in his *On Divine Names* 4.18-34, 163-78 (Suchla), Carlos Steel has argued that pseudo-Dionysius borrowed the phraseology wholesale, but distorted the sense, endorsing the view which Proclus presented only to reject, that evil does not exist, and misrepresenting the idea that evil participates in good as the idea that it is a lesser good. There is an interpolation in John of Scythopolis (*Scholia in de div. nom. PG* 4, 21D, not translated) reversing the order of plagiarism

and claiming that Proclus plagiarised Dionysius. Steel and Opsomer (2003) argue that the interpolation was written by Philoponus.

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4(f) Is matter evil?

Alexander finds the source of evil in matter. Text (1) is an earlier version, apparently (by the evidence of its style) from the circle of Kindî (first half of the ninth century), where Alexander tended to be freely adapted. Wherever the two Arabic versions differ, Abû Bishr's is likely to be closer to the original. The phrase 'bestower of forms' represents an expression 'former of forms' used of God in the Koran. The better known description of God as 'giver of forms' is usually associated with a later figure, Avicenna. For a Greek adumbration of this idea, see Philoponus *in GC* 169,7-8, translated under **21**, and see the suggestion on Alexander's influence under **1(b)**.

(1) Alexander *Prov.* 101,3-105,4 Ruland, early Arabic version (first half of the ninth century?)

Someone may ask: How, then, [are we to explain that] we find many evil people knowing nothing but evil, and find other things in the terrestrial world so devoid of order that the student of reasons can see no reason in them because they are beyond logic and [make no sense in terms of infallible] celestial control? Would it not appear that celestial control does not get it right in all cases, because it is sometimes open to failure? Our reply is that such [failings] are attributable, not to the control, but to matter, its recipient. Matter is one thing or another, not actually, but only potentially. In its weakness it is sometimes unreceptive to the action of the agent [working upon it]. What is potential is defective and incomplete. Matter, being *everything* potentially, is weak, defective, and open to failure. Unable to receive all forms bestowed on it by the bestower of forms, it sometimes declines, not on account of the maker, but on account of itself, as we explained.

Again, we say that [matter] is receptive to privation just as it is receptive to form. Being receptive to form, it inclines towards the excellence of nature, i.e. the force of the celestial body, submits to being formed by it, and longs to last for ever. Being receptive to privation – that is, being nothing in actuality – it does not incline towards the force of the celestial body, submit to its formative action, or long to last for ever but longs instead to vanish into nothingness. Therefore, the terrestrial world is sometimes open to failure – on account, that is, not of the celestial bodies, but of [terrestrial] matter, as we explained. FWZ

Plotinus in 2.9 [33], called by Porphyry 'Against the Gnostics', attacks the Gnostic idea that the material world is evil. Yet he can say elsewhere that matter is evil itself, the primary evil, evil in itself (1.8 [51] 3 (35-40); 8 (37-44); 13 (7-14)) and the source of evil in the soul. The last two passages conclude, against the Stoics, that vice, which is in the soul, is not the basic evil. He adds that even if soul produced matter and got contaminated thereby, matter would still be the source of evil. Plotinus can deny that evil is inherited from soul, perhaps because of his idea, quoted above from 3.2 [47] 2, that something may become unharmonious only when it is realised at a lower level, and not in its higher source.

(2) Plotinus 1.8 [51] 3 (35-40)

The [nature] which underlies figures, forms, shapes, measures and limits, and is adorned with adornment alien to it, possessing no good from itself, being a mere image in relation to real beings, the essence of evil, if there can even be an essence of evil: this is what the argument finds to be the primary evil and evil in itself. RRKS

(3) Plotinus 1.8 [51] 14 (49-54)

Matter, then, is both the cause of weakness and the cause of evil in the soul.

So matter is evil before soul and is the first evil. For even if it was soul itself that generated matter by being affected, and communicated with matter and became evil, matter was by its presence the cause. For soul would not have come to enter into matter, if it had not taken its birth from the presence of matter. RRKS

Plotinus' position does violence to Aristotle. For one thing, Plotinus identifies evil not only with matter, but also with privation, 1.8 [51] 11 (1-6), whereas Aristotle had distinguished privation from matter, *Physics* 1.7-9, as being a temporary attribute of matter, and one which gets replaced by form. Aristotle criticises certain Platonists for not distinguishing matter from privation, *Phys.* 1.9, 192a13-25, and it is privation that he calls evil, 192a14-16. Plotinus, however, in 2.4 [12] 14, attacks Aristotle's distinction of privation from matter. Proclus *On the Existence of Evils* ch. 38, upholds Aristotle's distinction and replies to Plotinus that privation of form is not evil, but neutral.

Plotinus further treats matter as contrary to the Forms, and so to substance, 1.8 [51] 6 (31-48), and thus rejects, at least as regards substance taken generally, Aristotle's view in *Cat.* ch 5, that substance has no contrary. Proclus in reply upholds Aristotle's denial, *On the Existence of Evils*, chs 37, 45.

(4) Proclus *On the Existence of Evils* 38.1ff. Boese

Here we have to dismiss the discussion of matter, and proceed again to the question of privation, since [there are] also some [who] say that this is evil and completely contrary to the good For matter remains as a substrate when the form is present, whereas privation has no being at all, as it is always an evil agent and contrary to the forms. And matter desires the good, strives for it and partakes in it, whereas privation flees the good, is the cause of destruction and is completely evil. But [this is not correct]. ...

In general, disorder and unmeasuredness, as we have said earlier, can be taken in two different ways: either as an absence of these – I mean, of measure and order – or as a nature contrary to these qualities. For the latter opposes order and measure, while the former is merely the deprivation of these and nothing but their negation; or rather, when these [properties] are present they are what they are, but, when absent, they just leave behind privations of themselves. Therefore, if evil is contrary to the good and discordant with it, but privation neither opposes the disposition of which it is the privation, nor is disposed to do anything, as its being is so weak and wraith-like – as they say – how could we still attribute the evil agency to privation, of which all activity is denied? For activity is a form and a power, whereas privation is formless and weak, and not power but rather absence of power. CS, JO

(5) Proclus *On the Existence of Evils* 45,15-17 Boese

And in general all evil is outside the substance and is not substance. For nothing is contrary to substance, but good is contrary to evil. CS, JO

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4(g) Fall of the soul: reasons why

Plato gave many hints about reasons for the fall of the soul and its embodiment. In the *Phaedrus*, the soul sheds its wings by moulting, 246C. In the *Timaeus*, a version of the principle of plenitude requires the sensible universe to be filled with every kind of being from the intelligible universe, 41B-C.

Plotinus refers to these and other ideas of Plato in 4.8 [6] 1 (23-51). He adds in the same treatise that embodiment enables the soul to exercise and discover powers that would otherwise be unused, 4.8 [6] 5 (28-36), and that the soul appreciates good better because of its experience of evil, 4.8 [6] 6 (11-17).

He interprets the choice of our next reincarnation at Plato *Republic* 617Dff. as a reference to our soul's long-term *proairesis* (policy) and disposition.

(1) Plotinus 3.4 [15] 5 (1-4)

But if the soul chooses its guardian spirit (*daimon*) and the course of its life there in the intelligible world, in what way do we still have control (*kurios*) over anything? The answer is that what is called the choice (*hairesis*) made there is an enigmatic way of expressing the soul's general and universal policy (*proairesis*) and attitude. BF

He uses the Stoic term for an instinctive sexual inclination *prothumia* to describe the attraction towards a body.

(2) Plotinus 4.3 [27] 13 (17-21)

[The souls] go [into bodies] neither willingly nor having been sent – the

voluntariness is not like having made a choice (*proaireisthai*) – but in the manner of a natural leaping, or as being moved to natural eagerness (*prothumiai*) for sexual union, or to perform some fine actions, but not by reason. RWS

He speaks of a fall away from God due to pride, which is likely to have been welcomed by Augustine as fitting with the Fall of Man in *Genesis*.

(3) Plotinus 5.1 [10] 1 (1-17)

What is it, then, that has made souls forget their father, God, and be ignorant of themselves and him, even though they are apportioned (*moirai*) from there and wholly belong to him?

The starting point of their evil was their audacity (*tolma*), their birth, the beginning of their otherness (*heterotês*) and their willing (*boulesthai*) to belong to themselves (*heautôn einai*). Once they evidently enjoyed their self-determination (*autexousion*) and made use of extensive self-movement (*kineisthai par' hautôn*), having run in the opposite direction and greatly distanced (*apostasis*) themselves, they lost sight of the fact that they too came from that world. They are just like people snatched in childhood from their parents, who are unaware of themselves and their parents because of their lengthy upbringing away from them. So our souls no longer see either their father God or themselves; they disregard (*atiman*) themselves and regard everything else more highly than themselves through ignorance of their origin; they show admiration (*thaumazein*) for anything rather than themselves. All this causes them shock (*ekplêttesthai*) in relation to those things, infatuation and dependency, so that they have divorced themselves as far as they are able, disregarding what they have abandoned (*apostrephesthai*). As a result, their regard for all this and their disregard for themselves has become the cause of their utter ignorance of him [God]. BF, RRKS

Macrobius, probably following Porphyry's lost *On the Return of the Soul*, says that humans were given the task of looking after the sphere called earth (cf. Philoponus *in DA* 6,20), so must not commit suicide.

(4) Macrobius *in Somn. Scip.* 1.13.4

People were born to look after that sphere called earth which you see in the middle of this sanctuary. GC

But Iamblichus took the subject much further. One reason, cited from the Middle Platonist Taurus, is the principle of plenitude, another that the gods wish to show themselves through souls. Some souls descend in order to purify things here, others to correct their own characters, others by way of punishment.

(5) Iamblichus *On the Soul ap.* Stobaeum 1,378,25-379,6 Wachsmuth

[27] Taurus and his followers say that the souls are sent to the earth by the gods. Some of them, consistently with the *Timaeus*, teach that this occurs for the completion of the universe so that there will be just as many living things in the cosmos as there are in the intelligible realm. Others attribute the goal (*telos*) of the descent to the demonstration of divine life. For this is the will (*boulêsis*) of the gods: to show themselves as gods through the souls. For the gods come forth into the open and show themselves through the pure and immaculate lives of souls. JD, JF

(6) Iamblichus *On the Soul ap.* Stobaeum 1,380,6-19 Wachsmuth

[29] Furthermore, I think that the purposes (*telê*) for which souls descend are different and thereby also cause differences in the manner of the descent. For the soul that descends for the salvation, purification, and perfection of this realm is immaculate in its descent. The soul, on the other hand, that directs itself about bodies for the exercise and correction of its own character is not entirely unaffected and was not sent away free in itself. The soul that comes down here for punishment and judgement seems somehow to be dragged and forced.

<Certain more recent philosophers> – especially Cronius, Numenius, Harpocration and their school – do not make these distinctions, but, lacking a criterion of differentiation, they conflate the embodiments of all souls into one single kind and maintain that all embodiments are evil. JD, JF

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5. Determinism and Fate

Determinism is the view that whatever happens, it has all along been necessary or inevitable that it should happen. The most persuasive reason for thinking this trades on the assumption that what is caused is necessitated (an assumption challenged in Richard Sorabji, *Necessity, Cause and Blame*, ch. 1). But the argument for determinism which is perhaps most widely known from antiquity is the sea-battle argument reported and attacked by Aristotle in *On Interpretation* 9. According to this argument, if there will be a sea battle tomorrow, it was true ten thousand years ago that there would be, and hence, allegedly, it is inevitable or necessary. It is not explained what is supposed to justify the leap to necessity. On one view, it is the irrevocability of the past which is supposed to apply to past truth, and this irrevocability will supposedly then infect tomorrow's sea battle.

Aristotle's reply, according to Alexander and the Aristotelian school (Simplicius *in Cat.* 407,6-13; Boethius *in Int.*^{2} 208; Alexander *On Fate* 177,17-178,7; 187,22; 188,3; 197,12-17), was that statements about contingent matters in the future are not, or not yet, true or false. Before Alexander, this view is endorsed by the Platonist critic of Aristotle, Nicostratus. But a different answer is adumbrated in one of the *Quaestiones* (1.4) attributed to Alexander and spelled out and endorsed in commentaries on Aristotle's chapter by Ammonius and Boethius. According to this answer, statements about future contingents are not *definitely* or *determinately* true or false (*aphorismenôs*), yet they evidently are true or false, because Boethius rejects the interpretation of Aristotle, which he calls Stoic, that they are neither.

For Ammonius, being determinately true seems to be the same as being *necessarily* true, since in the passages quoted below he repeatedly says that loss of contingency follows straight away (*autothen*) from determinate truth, without further premises. That means that indeterminate truth, which Aristotle is said to concede to future contingents, might be just plain truth. But there is another possibility, which might correspond to Boethius' interpretation. If we take the pair of predictions, 'there will be a sea battle tomorrow', 'there will not be a sea battle tomorrow', the pair has one member true, one false (that is how the Stoic 'neither true nor false' is avoided). But the truth and falsity are not yet distributed in one direction rather than the other. I do not think this view coherent, but it has the advantage, as an interpretation of Ammonius and Boethius, of explaining why they often put their point in terms, not simply of determinate truth, but of the determinate *division* of truth and falsity. Moreover, Boethius goes on to talk of the *pair* of statements immediately after talking of indeterminate truth. This means that for him indeterminate truth could be slightly different from plain truth. It will be a property that belongs to a statement in virtue of truth-or-falsity belonging to the pair of statements, although plain truth, or plain falsity, will come to belong to the statement, at latest when the time predicted for the sea battle has passed. Strobach (see below) has pointed out that what is indeterminately true, on this interpretation, is also indeterminately false.

5(a) The sea battle and definite truth

(1) Nicostratus *ap.* Simplicium *in Cat.* 406,6-16

But Nicostratus censures [Aristotle] here too, saying that dividing the true and the false is not the distinguishing mark (*idion*) of things opposed as a contradictory pair. '[For dividing the true and the false] belongs neither exclusively to [contradictory oppositions] nor to all of them: not to them exclusively, because the necessity of one or the other's [being true or false] also belongs to sentences containing positive and negative oaths, such as "Yes by Athena, I did that!", "No by Athena, I did not do it!"; and indeed (he says) the same holds for expressions of wonder, such as "How beautiful the Piraeus is!", <"The Piraeus is not beautiful"> and of blame, such as "How worthless he is", "He is not worthless". So this [i.e. dividing the true and the false] does not belong exclusively to those things [opposed] as a contradictory pair; but nor (he says) [does it belong] to all of them. For those statements which are inclined (*enkeklimenai*) towards the future time are neither true nor false owing to the nature of the contingent. For neither "There will be a sea battle" nor "There will not be a sea battle" is true, but it will be as chance has it.' RG

(2) Alexander(?) *Quaest.* 1.4, 12,13-12,19; 13,2-9

And further, if that is possible from which, if it is supposed that it is the case, nothing impossible results; and [if], from everything of which the opposite is truly said beforehand, there results, if it is supposed that it is the case, the impossibility that the same thing both is and is not at the same time; [then] none of those things, of which one part of the contradictory disjunction referring to the future [sc. either p will be or p will not be] is true determinately, would be [the case] contingently. But they say that in all cases one part of the contradictory disjunction is true determinately (*aphôrismenôs*). ...

But [if] it is alike possible for the same thing to come to be and not to come to be, how is it not absurd to say, in the case of these things, that one part of the contradictory disjunction spoken beforehand [sc. either p will be or p will not be] is determinately true, and the other a falsehood, [when] the thing in question is similarly capable of both? For it follows, for those who say that the things that come to be do so in this way, that they are saying [either] that both the assertion and the negation similarly come to be true in the case of things that come to be in this way, or that each [of them] similarly [comes to be] false. RWS

(3) Boethius *in Int.*^{2} 208,1-18 Meiser

Now some people – the Stoics among them – thought that Aristotle says that future contingents are neither true nor false. For they interpreted his

saying that nothing [of that sort] is disposed more to being than to not being as meaning that it makes no difference whether they are thought false or true; for they considered them to be neither true nor false [in Aristotle's view] – but falsely. For Aristotle does not say that both are neither true nor false, but, of course, that each of them is either true or false – not, however, definitely (*definite*), as with those having to do with past matters or those having to do with present matters. [He says] instead that there is in a way a dual nature of statement-making utterances; some of them are not only such that the true and the false is found in them, but also such that one of them is definitely true [and] the other definitely false; of the other [statement-making utterances], however, one is true [and] the other false, but indefinitely and mutably – and this as a result of their own nature, not relative, to our ignorance or knowledge. NK

(4) Boethius *in Int.*[2] 106,30-107,16 Meiser

For [in that connection] it is necessary that either the affirmation be true or the negation, but not that one of them be definitely true and the other definitely false. For if someone else denies what we say, 'Alexander is to be bathed', and says 'Alexander is not to be bathed', it is indeed necessary that this whole state of affairs come about – that either he is bathed or he is not bathed – and it is necessary that one be true and the other false: either the affirmation, if he has been bathed, or, if he has not been bathed, the negation. But it is not necessary that the affirmation be definitely true, because in cases of this sort the negation could come about. Nor is it ever definite that the negation be true ([and] the affirmation false) because the negation can fail to come about. Accordingly, as regards the whole contradiction it is of course necessary that one be true and the other false. But that one be definitely true and the other definitely false – as is the case regarding those that are past or present – is not possible on the basis of any reason associated with the things, events, or states of affairs. NK

(5) Ammonius *in Int.* 139,32-140,4

Next, he begins from the axiom of contradiction, saying that, necessarily, of singular contingent propositions taken in the future time, one or the other is true, since it is neither possible for both to be false together nor for both to be true together. DB

(6) Ammonius *in Int.* 141,31-141,2

These things being so, having taken from the preceding that, necessarily, of singular contingent propositions which contradict one another in the future time one is true in a definite manner (*hôrismenôs*) and the other false, thinking that it follows immediately that the contingent is destroyed by what has been assumed, he says [*Int.* 18b5-6] 'Therefore, nothing either

is or is happening either by chance (*apo tukhês*) or however it chances (*hopoter' etukhen*)', signifying by the 'therefore' that it follows from the necessity of the assumptions that the contingent is destroyed. DB

(7) Ammonius *in Int.* 143,17-22

But if one of these will be speaking truly in a definite manner (*hôrismenôs*), and the destruction of the contingent followed from the fact that one premiss of the contradiction is true in a definite manner, then it is apparent that the contingent will disappear from among the things which exist, both the rest of it and also its point, so to speak, the 'however it chances', which Aristotle used for the whole of the contingent. DB

(8) Ammonius *in Int.* 144,9-14

What was said in the foregoing with insufficient clarity to establish that the propositions taken in the future time, about which he is speaking, also divide in a definite manner (*aphôrismenôs*) the true and false, from which it immediately followed that the contingent had no place among existing things, he here wants to show us more clearly, extending his discourse with greater elaboration. DB

(9) Ammonius *in Int.* 148,5-12

So, teaching thus far in these words the impossible things which follow for those who destroy the contingent, he says that if one should think that every contradiction behaves in the same way in every time with respect to dividing the true and false, and that not just the diagonal contradictions, which he has been calling 'universal as universal',[1] always have in a definite manner (*aphôrismenôs*) one of their propositions true and the other false in every matter, but the singular contradictions as well, [an assertion] from which it would follow that the contingent is eliminated, then one would be accusing nature of vain toil for having made us capable of deliberation. DB

[1] e.g. 'every man is pale', 'not every man is pale', arranged diagonally in Aristotle's so-called 'square of opposition', *Int.* 7, 17b16ff.

(10) Ammonius *in Int.* 149,15-18

Then, having reminded us again of the argument which appeared to destroy the contingent (I mean, of the fact that, of two people foretelling a contradiction, one speaks the truth in a definite manner (*hôrismenôs*) and for this reason what is said by him occurs).... DB

Elsewhere in his commentary, Boethius gives an entirely different account: What Aristotle's determinist was discussing was not prior truth, but prior predictability.

In that case, to answer him, we need only point out that not everything is predictable.

(11) Boethius *in Int.*[1] 118,13-119,13 Meiser

For in order that deliberation be removed and annihilated, so that people need not deliberate about anything at all, it matters little whether something is predicted. For whether or not something is said, it is necessary regarding whatever could have been predicted truly that it come about even if it is not said. For it is predicted truly for this reason, that it can be predicted truly; [and] it can be predicted truly because it is immutably going to be. Accordingly, it is going to be if it is predicted truly, and not only if it is predicted, but even if it can be predicted truly. For whether it is said or not said, whatever can be predicted truly is necessarily going to be.

'For it is evident,' he says, 'that the actual things are disposed in this way' whether or not one person affirms it [and] another denies it. If it is going to come about, the negation opposes nothing to it; if it is not going to come about, the affirmation is good for nothing. 'For,' he says, 'it is not because of the affirming or denying that it will be or will not be', nor will time alter this force of nature (*vis naturae*). For things that people believe are going to come about after a thousand years come about in the same way as those that are necessarily going to be after any length of time whatever. And so it happens that if at every time everything is so constituted that one can be said with definite truth and the other with definite falsity, then everything whatever that has happened or that will happen occurs by an immutable rationale associated with things, events, or states of affairs. NK

(12) Boethius *in Int.*[2] 229,21-230,3 Meiser

At the same time, however, Aristotle, linking the foretelling and the outcome, bases the necessity of things, events, or states of affairs on the very truth of propositions, saying that if these things are so (in such a way that everything that has happened has at every time been so disposed that that very thing would have been truly predicted), then 'it would be necessary that that happen' – i.e., it would be necessary that what has been truly predicted come about. For every one of the things that happen and are truly predicted is disposed in such a way that it happens of necessity. But the reason why it happens is this: whatever anyone says truly, it is necessary that it happen, for that truth stems from the necessity of the things, events, or states of affairs. But if regarding that which has happened it had also been correctly foretold that it was going to happen, then there would be no doubt that all things come about of necessity. NK

Reading

Richard Sorabji, ed., *Ammonius and Boethius on Aristotle On Interpretation 9*, London 1998, reviewed by Niko Strobach, in *Philosophische Rundschau* 46, 1999, contains besides the translations by David Blank and Norman Kretzmann, and a

bibliography, three articles or revised versions of articles on the subject, as follows:

Norman Kretzmann, revised version of 'Boethius and the truth about tomorrow's sea battle', from *Logos and Pragma: Essays in Honour of G. Nuchelmans*, Nijmegen 1987.

Mario Mignucci, 'Ammonius' sea battle'.

Richard Sorabji, 'The three deterministic arguments opposed by Ammonius'.

See further:

Dorothea Frede, 'The sea battle reconsidered: a defence of the traditional interpretation', *Oxford Studies in Ancient Philosophy* 3, 1985, 31-83.

Richard Gaskin, 'The commentators' interpretation of *de Interpretatione* 9', ch. 12 in his *The Sea Battle and the Master Argument: Aristotle and Diodorus Cronus on the Metaphysics of the Future*, Berlin 1995.

Richard Gaskin, 'Alexander's sea battle: a discussion of Alexander of Aphrodisias *De Fato* 10', *Phronesis* 38, 1993, 75-94.

J. Isaac, *Le Peri Hermeneias en Occident de Boèce à Saint-Thomas*, Paris 1953.

N. Rescher, *Studies in the History of Arabic Logic*, Pittsburgh 1963, ch. 5.

N. Rescher, 'Truth and necessity in temporal perspective' in R. Gale, *The Language of Time*, London 1968.

Gerhard Seel, 'The battle of the sea battle, Ammonius' solution of Aristotle's puzzle', *Proceedings of the 13th Symposium Aristotelicum*, held at Siena, eds Mario Mignucci, Michael Frede, forthcoming.

Gerhard Seel, ed., *Ammonius and the Sea Battle*, Berlin 2001.

R.W. Sharples, *Alexander of Aphrodisias: Quaestiones 1.1-2.15, Ancient Commentators on Aristotle*, ed. Richard Sorabji, London & Ithaca, NY 1992, *Quaestio* 1.4, 12-13, n. 81.

R.W. Sharples, 'An ancient dialogue on possibility: Alexander of Aphrodisias *Quaestio* 1.4', *Archiv Gesch. Philos.* 64, 1982, 23-38.

Richard Sorabji, *Necessity, Cause and Blame*, London 1980, ch. 5.

J. Talanga, *Zukunftsurteile und Fatum: Eine Untersuchung über Aristoteles De Interpretatione 9 und Ciceros De Fato mit einem Überblick über die Spätantiken Heimarmene-Lehre*, Bonn 1986.

F.W. Zimmermann, *Al-Farabi's Commentary and Short Treatise on Aristotle's de Interpretatione*, Oxford 1981.

5(b) Omniscience and determinism

Ammonius in his commentary picks out two quite different deterministic arguments as the most worrying. One is the argument from divine foreknowledge. This is indeed worrying, because if God already foreknows what I will do tomorrow, it is too late for me so to act that He has a different belief about how I will act. And if his knowledge, unlike human knowledge, is infallible (*incapable* of being wrong), it is not possible for me so to act that he is wrong. This fateful combination of irrevocability and infallibility is attacked by Boethius in a passage already referred to above under **3(a)(iii)** from *Consolation* 5, prose 6. It is the irrevocability we can reject, because God's knowledge is not foreknowledge, but timeless knowledge. It therefore no more restricts my freedom to act otherwise than does the contemporaneous knowledge of a human who sees what I am doing while I am doing it.

(1) Boethius *Consolation* 5 prose 6, sections 16-21 Bieler, *CCL* 94

[16] And so, if you are prepared to consider the 'foresight', by which God

discerns all things, not as the foreknowledge (*praescientia*), as it were, of what is going to be in the future, but rather as knowledge of a never-failing present, you will judge more correctly. [17] And for this reason it is more correctly called not *praevidentia* (foresight) but *providentia* (looking forth), because, established far above the lowliest things, it looks forth on all things as if from a high peak among things. [18] Why therefore do you insist that things which are surveyed by the divine sight should be necessary, when not even men make the things that they see necessary? [19] Surely, when you see present things, your gazing does not impart any necessity to them? Certainly not. [20] But, if it is right to compare the divine present with the human, then, just as you see some things in this temporal present of yours, just so does God see all things in his eternal present. [21] And for this reason this divine foreknowledge does not change the nature and character of things, and sees things present to itself in the same way as they are going to come to be in time at some future time. RWS

Parallel arguments from Proclus *Prov.* 63-4; Proclus *de Dec. Dub.* 2.6 have already been translated under **3(a)(iii)**. Although the future is indeterministically indefinite, God's knowledge of it does not need to be an indefinite 'it may or may not be'. God, according to a principle of Iamblichus explained there, can have *definite* knowledge of an *indefinite* future and *certain* knowledge of an *uncertain* future. Boethius is making another application of the principle for the same indeterministic purpose, when he says that God can have *timeless* knowledge of a *temporal* future.

Reading

Richard Sorabji, *Necessity, Cause and Blame*, London 1980, ch. 6.
Richard Sorabji, *Time, Creation and the Continuum*, London & Ithaca, NY 1983, ch. 16 and pp. 240-1.

One Platonist way of avoiding necessity and preserving human responsibility will be discussed under **5(j)**, viz. that some Platonists restricted divine foreknowledge by pointing out that oracular predictions typically contain an 'if': 'If you, Laius, beget a son, he will kill you.' The Christian Origen we shall see, exploited this restriction in his *ad homines* reply to pagan Greek determinists, *Contra Celsum* 2.20. In the same breath, he said that Judas, like Laius, was responsible for his actions, despite Christ's foreknowledge (so also *On Prayer* 6.5). But Origen does not describe Christ's foreknowledge as restricted by an 'if' in the same way as that of the pagan oracles.

Reading

R.W. Sharples, 'Alexander of Aphrodisias *De Fato*: some parallels', *Classical Quarterly* 28, 1978, 243-66.
I. Hadot, *Le Problème du Néoplatonisme Alexandrin: Hieroclès et Simplicius*, Paris 1978, 133-7.
Richard Sorabji, *Time, Creation and the Continuum*, London & Ithaca, NY 1983, 241.

5(c) The reaper

The other deterministic argument picked out by Ammonius as especially worrying is The Reaper, which trades on the logic of 'perhaps'. 'Perhaps he will reap' can be a guarded prediction, in which case it is refuted by his not reaping. Or it can be a statement of present possibilities, in which case it is not so refuted. But if these two usages are confused, it can come to seem that his not reaping refutes the idea that there was an earlier possibility of his reaping, in other words that, as the determinist wants, his not reaping was inevitable.

(1) Ammonius *in Int.* 131,20-132,7

Now, since this study has such great force in regard to our entire life, I consider it necessary to set out and resolve those of the arguments attempting to make all things necessary which are thought (*dokountes*) to pose a puzzle (*aporia*) for those who hear them. Of these two, one more verbal (*logikôteros*) and the other more troublesome (*pragmateiôdesteros*), the more verbal one proceeds as in the case of some activity (*energeia*) of ours, e.g. our activity of reaping (*therizein*), in the following manner: 'if you will reap', it says, 'it is not the case that perhaps (*takha*) you will reap and perhaps you will not reap, but you will reap, whatever happens (*pantôs*); and if you will not reap, in the same way it is not that perhaps you will reap and perhaps you will not reap, but, whatever happens, you will not reap. But in fact, of necessity, either you will reap or you will not reap'. Therefore the 'perhaps' has been destroyed (*anêirêtai*), given that it has no place either in the opposition of reaping to not reaping, one of these occurring of necessity, or in what follows from either of the hypotheses. But the 'perhaps' was what introduced the contingent. Therefore, the contingent is gone.

[131,32] Now, against this argument it is easy [for us] to answer that 'whenever you say 'If you will reap, it is not so that perhaps you will reap and perhaps you will not reap, but you will reap, whatever happens', how do you think that the 'will reap' (*to theriein*) is presupposed, as necessary or as contingent'? If it is as contingent, we have what we are seeking, and if it is as necessary, then, first, you are asking that we grant you as evident just what you have been seeking from the beginning, and second, 'will reap, whatever happens' will be true, but there will no longer be room to say 'but in fact either you will reap or you will not reap' – for, if one of these occurs necessarily and the other, obviously, is impossible, how is there room to say 'but in fact either this will be or this'? Thus, this argument does not work for them so far. DB

(2) Stephanus *in Int.* 34,34-35,10

How Aristotle raises the problem and resolves it we shall learn in the detailed commentary on the Aristotelian text, and in order to destroy the contingent we shall bring in from outside [his writings] two arguments, of

which one is verbal (*logikos*), that is, it stays on the surface, whereas the other is more troublesome (*pragmatoeidês*).

The verbal one sets out from some activity of ours as follows. If you are going to reap, it says, it is not the case that perhaps (*takha*) you will reap and perhaps not, but you will definitely reap. Again with the denial, if you are not going to reap, it is not the case that perhaps you will not reap and perhaps you will, but definitely you will <not> reap. 'Definitely' introduces necessity; and once necessity is brought in, contingency vanishes.

[35,5] To this it is easy to reply that it takes as agreed precisely what is under enquiry. The hypothesis 'If you are going to reap' is not yet established; for that is what is being enquired into. Every hypothesis has to be established through a categorical argument. We all know that if I am going to reap, definitely I am going to reap. But whence is it clear that I am going to reap? That is not yet established by a categorical argument. That is argument one. WC

(3) Anonymous *in Int.* 54,8-55,5 Tarán

One must know, therefore, that the Stoics, denying 'possibility', put forward two particular difficulties, one rather more superficial (*epipolaios*) and the other rather more troublesome. This then is the superficial one: [They say] if you are actually going to reap – as opposed to if you intend to reap – you will definitely reap, and you will not perhaps (*takha*) reap and perhaps not reap, but rather you will definitely reap. Conversely, if you are not going to reap, you will definitely not reap, and you will not perhaps not reap and perhaps reap, but you will definitely not reap. So truly either you will reap or you will not reap. Thus 'possibility' is denied. Indeed, they say, it is shown that of necessity either you will reap or you will not reap, so the possibility that you [might or might not] reap does not exist.

[54,19] But, to resolve this difficulty, we ask them does the statement 'you are going to reap' also imply the possibility that you will not reap? For if they agree that it does, we have attained what we were seeking to prove. And if they do not agree, but say that it implies necessity, then we ask them how can you say such a thing as 'but surely either you will reap or you will not reap' for this implies possibility [i.e. that you may do one or the other]. MR

Reading

Richard Sorabji, *Ammonius and Boethius on Aristotle On Interpretation 9*, London & Ithaca, NY 1998, ch. 1.

5(d) Causation as implying the same outcome in the same circumstances

This deterministic view is ascribed to the Stoics. Bobzien has argued that the Stoics in question are late ones, starting with Philopator in the second century AD, while Salles has argued that 'same outcome in same circumstances' is required by the

early Stoic theory of eternal recurrence of history, not for causal but for teleological reasons, to do with the best possible world.

(1) Alexander *On Fate* 22, 192,22-3

There are, then, several sorts of cause, and they say that it is equally true of all of them that it is impossible that, when all the circumstances surrounding both the cause and that for which it is a cause are the same, the matter should sometimes not turn out in a particular way and sometimes should. For if this happens there will be some motion without a cause. RWS

(2) Alexander *On Fate* 15, 185,8-9

To rely on the argument that 'if in the same circumstances someone acts now in this way and now in another, motion without a cause is introduced', and for this reason to say that no one can do the opposite of what he will do – may this too not be an oversight like those already mentioned? RWS

Reading

Susanne Bobzien, 'Stoic conceptions of freedom and their relation to ethics' in Richard Sorabji, ed., *Aristotle and After, Bulletin of the Institute of Classical Studies*, suppl. 68, 1997.

Susanne Bobzien, 'The inadvertent conception and late birth of the free will problem', *Phronesis* 43, 1998, 133-75.

Susanne Bobzien, *Determinism and Freedom in Stoic Philosophy*, Oxford 1998.

Ricardo Salles, 'Determinism and recurrence in early Stoic thought', *Oxford Studies in Ancient Philosophy* 24, 2003, 253-72.

R.W. Sharples, *Alexander of Aphrodisias: On Fate*, London 1983.

5(e) Possibility

Determinism denies that any alternatives to what happens are even possible. So definitions of possibility can be used to support or attack determinism. Diodorus Cronus, the dialectician, somewhat younger than Aristotle, gave a definition of the possible which was thought to support determinism: The possible is that which is or will be, or is or will be true. What seems to imply determinism is the idea that nothing else is possible. In fact, Diodorus does leave room for alternative possibilities, if one is allowed to count the fact that the sentence-types 'there will be a sea battle tomorrow' and 'there will not be a sea battle tomorrow' can both be used, on different occasions, to express a truth. But the determinist may trade on the fact that this is not the case for such a pair as 'there is [tenseless] a sea battle in the year 3000', 'there is [tenseless] not a sea battle in the year 3000'.

Diodorus is said to have supported his definition of the possible by means of the so-called Master Argument, whose premisses are given only by the Stoic Epictetus (*Discourses* 2.19.1), namely: Whatever is past and true is necessary and the impossible does not follow from (or on) the possible. The wonderful ingenuity of scholars in trying to reconstruct the argument can be followed in the Reading

below. Here I will record only the definitions, which our sources report alongside two very different ones by Philo the dialectician and by the Stoics.

Diodorus Cronus:

(1) Boethius *in Int.*[2] 234,22-6

Diodorus delimits the possible as that which either is or will be; the impossible as that which when it is false will not be true; the necessary as that which when it is true will not be false; the non-necessary as that which either now is or will be false. NK

(2) Alexander *in An. Pr.* 183,34-184,10

He could also be speaking of 'The Possibles'; [first] that which is called Diodorean [possibility], that which either is or will be. For [Diodorus] posited that that alone is possible which either is or will be whatever happens (*pantôs*). For me to be in Corinth is possible, according to him, if I am in Corinth or if I am going to be there whatever happens; but if I do not [go] there, it was not possible [for me to]. And it is possible for a child to become literate, if he will be whatever happens. And it was to establish this that Diodorus put forward the Master Argument. And similarly [Aristotle might be speaking] of the [possible] according to Philo; this was that which is in accordance with the bare suitability (*epitêdeiotês*) of what is involved, even if it has been prevented by some external necessity from coming to be by something outside. Thus he said that it is possible for the chaff which is [divided into] atoms or in the depths of the sea to be burned, being there, even though it is prevented by the things which surround it, of necessity. RWS

Reading

Gordon Brittan, ed., *Causality, Method and Modality: Essays in Honour of Jules Vuillemin*, Dordrecht 1990; see David Wiggins's paper, 'Temporal necessity, time and ability in Jules Vuillemin's reconstruction of Diodorus' Master Argument'.

Richard Gaskin, *The Sea Battle and the Master Argument: Aristotle and Diodorus Cronus on the Metaphysics of the Future*, Berlin 1995, contains an updated bibliography.

Jaako Hintikka, *Time and Necessity*, Oxford 1973, ch. 9.

Arthur Prior, 'Diodoran modalities', *Philosophical Quarterly* 5, 1955, 205-13.

Arthur Prior, *Past, Present and Future*, Oxford 1967.

Nicholas Rescher, 'A version of the "Master Argument" of Diodorus', *Journal of Philosophy* 63, 1966, includes bibliography up to 1966.

Richard Sorabji, *Necessity, Cause and Blame*, London 1980, ch. 6.

Jules Vuillemin, *Nécessité ou contingence: l'aporie de Diodore et les systèmes philosophiques*, Paris 1984.

A quite different definition of the possible is ascribed to another dialectician, Philo. It is possible for a piece of wood at the bottom of the ocean to be burnt, in virtue of the bare fitness (*epitêdeiotês*) of the subject and despite the external obstacles. By

this test of possibility, alternatives would be possible, even if fate ensured that obstacles prevented one of the two outcomes from being realised.

Although some Stoics followed Philo, most Stoics differ, not surprisingly seeing that they are determinists, by laying down a second necessary condition, not only something corresponding to Philo's fitness, but also the absence of external obstacles. Thus the possible is that which admits (*epidektikon*) of being true, there not being opposition from external obstacles. The absence of obstacles, it has been convincingly shown by Michael Frede, is a second prerequisite for possibility, not merely a prerequisite for the possible thing being actual.

The Stoic view is given most clearly by Diogenes Laertius *Lives* 7.75. The two definitions are contrasted, though only Philo is named, at Simplicius *in Cat.* 195,31-196,6; pseudo-Plutarch *On Fate* 571A.

Reading

Michael Frede, *Die stoische Logik*, Göttingen 1974, 107-17.
Richard Sorabji, *Necessity, Cause and Blame*, London 1980, 78-9.
Richard Sorabji, *Time, Creation and the Continuum*, London & Ithaca, NY 1983, chs 7 and 16.

All three definitions are given by Boethius, two by Alexander.

Philo the dialectician and the Stoics:

(3) Boethius *in Int.*[2] 234,10-26

There are, however, three views regarding possibility. For Philo says that the possible is this: that the very nature of the statement admits of truth – as when I say that I am going to reread Theocritus' *Bucolica* today, [since] considered in itself, if nothing external prevents it, this can be truthfully asserted. At the same time, Philo defines the necessary in the same way to be [this:] that [the very nature of the statement is such that] when it is true, then considered in itself it can never admit falsity. And he delimits the non-necessary as that which considered in itself can admit falsity; but the impossible as that which in accordance with its own nature can never admit truth. But he confirms that the contingent and the possible are one.

Diodorus delimits the possible as that which either is or will be; the impossible as that which when it is false will not be true; the necessary as that which when it is true will not be false; the non-necessary as that which either now is or will be false. But the Stoics, indeed, have set up the possible as that which would admit of true predication when [other things] which can happen together with it (even though they are external to it) do not in any way prevent it; the impossible as that which never admits any truth with other things external to its own outcome preventing it; the necessary as that which when it is true does not admit false predication for any reason. NK

(4) Alexander *in An. Pr.* 183,34-184,10, translated above

Taurus, the Middle Platonist, offers yet another definition of possibility: a body, e.g. a log at the centre of the earth, is visible, if it is of the same genus as things seen.

(5) Taurus *ap.* Philoponum *Contra Proclum* 146,8-13

Something is then called a generated thing, if, though it did not come into existence, it is in the same genus as generated things. Thus we call visible what neither is, was, nor will be seen, but is in the same genus as things seen, for example if there were a body at the centre of the earth. RRKS

Alexander attributes to the Stoics certain attempts to preserve contingency after all by redefinition. Thus contingent propositions may be understood as ones which cease to be true. And the future tense *'will'* ensures that the proposition that there will be a sea battle tomorrow ceases to be true, once the battle is over.

It is not remarked that by the same token 'Scipio *will* die' must have ceased to be true, yet his eventual death was surely necessary. Nor is the modern view discussed, that there is no *single* proposition that there will be a sea battle tomorrow, but different propositions expressed at different times by use of the same sentence, 'there will be a sea battle tomorrow'. Those expressed the day before a sea battle are changelessly true, the rest are changelessly false. In that case, none of these propositions will be contingent by the criterion of ceasing to be true.

(6) Alexander *On Fate* 177,7-14, reporting Stoics

And similar to this is the argument that the proposition 'there will be a sea-battle tomorrow' can be true but not also necessary; for what is necessary is what is always true, but this [proposition] no longer remains true when the sea-battle comes to be; but if this is not necessary, neither is what is signified by it of necessity, [namely] that there will be a sea-battle. But if there will be a sea-battle, but not of necessity (since it *is* true that there will be a sea-battle, but not [true that there will be a sea-battle] of necessity), clearly [there will be a sea-battle] contingently; and if contingently, the coming-to-be of some things contingently is not done away with by the coming-to-be of all things in accordance with fate. RWS

Alexander also ascribes to the Stoics an epistemic sense in which alternatives to what is fated are possible, i.e. compatible with our state of knowledge.

(7) Alexander *On Fate* 176,17-177,7, reporting Stoics

[Consider the following argument] 'The opposites of the things that come to be in accordance with fate have not been prevented from coming to be (for which reason they are still possible even though they do not come to be). That they have not been prevented from coming to be is shown by the fact that the things that prevent them are unknown to us, although there certainly *are* some.' (For the causes of the coming to be of the opposites of these things in accordance with fate are also the causes of these things' *not* coming to be, if, as they say, it is impossible for opposites to come to be in the same circumstances. However, because certain things that exist are not

known to us, for this reason they say that the coming to be [of the opposites of the things that are in accordance with fate] is not prevented.)

[176,23] Well, how is saying this not the action of those who jest in arguments where jesting is not what is needed? For our ignorance makes no difference to the existence or non-existence of the facts. It is clear, when people speak like this, that the possible will according to them exist in virtue of our [degree of] knowledge. For those things will not be possible, for those who can know their causes (and these would be the prophets), that *are* possible for those who know that they have been prevented but do not know by what they are prevented.

[177,2] Preserving the nature of the possible in the way we have described, they say that even the things that come to be in accordance with fate, although they come to be unalterably, do not come to be of necessity for this reason, that it is possible for their opposites too to come to be – possible in the sense described above. But these are, as I have said, the arguments of those who jest rather than of those who are supporting a position. RWS

5(f) Chance

Aristotle denies that talk of chance merely expresses our ignorance of the causes operating. His idea of chance is of an unusual and not self-explanatory coincidence (*kata sumbêbekos*) between two things, *Phys.* 2.4-6. If it is lucky (*tukhê*), then it is a coincidence whose results might have been sought on purpose, if the information had been available, for example, digging at exactly the same place where someone else had hidden treasure, or going to the market place just when one's debtor is there loaded with funds. In *Metaph.* 6.3, on Sorabji's view, Aristotle denies that coincidences have causes, arguably because they have no explanation. He is quite right that the place chosen for each act of digging can in each case have a perfectly good (though unconnected) explanation – it can even in each case have been (for unconnected reasons) inevitable – without there being any explanation at all for the same place being chosen. Unfortunately, in *Metaph.* 6.3, Aristotle draws the unwarranted further conclusion against the determinist, that the coincidence, besides being uncaused, is also unnecessitated.

Alexander and Boethius both accept Aristotle's account and examples of chance, or Fortune, but alter them. Alexander does not seem to see the basis on which Aristotle argues for coincidences being uncaused, but argues on a different basis that chance precludes the determinist's necessitation. He urges, *inter alia*, that digging does not on its own necessitate finding treasure, which leaves us wondering whether it does in combination. Alexander adds that the digging was not aiming at finding treasure, and was not a proper, or, to use a Stoic term, principal (*proêgoumenos*) cause of the finding. He comes closest to Aristotle's point when he says that the finding did not come to be on account of (*dia*, text (3)) the digging.

Boethius, *Consolation* 5 prose 1 repeats the digging example, but, as explained under **4(c)** above, where the passage is quoted, he deviates from Aristotle by making Providence the explanation of favourable coincidence. That deviation helped to make Fortune acceptable to Christianity, but it is not yet apparent in his commentary on Aristotle, cited here.

(1) Alexander *On Fate* 172,25-173,7

For they say that someone has found a treasure from luck, if, when digging for the sake of something else and not for that of finding treasure, he chances on a treasure. For the man who dug for this reason [sc. that of finding treasure] did not [find the treasure] from luck; there happened to him that for the sake of which he dug. But the man whom all describe as having found the treasure from luck is the man who had no concern with finding the treasure, but to whom, when he was acting for the sake of something else, the finding of the treasure happened as the [accidental] end of that [action]. And they describe someone as having recovered money from luck when he goes to the market-place for the sake of something else, chances on his debtor who has money with him, and recovers what was owing to him. For his coming to the market-place had some other primary end, but the collection of what was owed happened to it, coming to be as an end for it *per accidens*. For one would no longer be described as having recovered a debt 'from luck' if one went to the market-place for the sake of this, for one's going would have the end that was set before it. RWS

(2) Alexander *On Fate* 174,14-20

For the causes of the discovery of the treasure and of the collecting of the debt are not obscure to human reasoning, but clear and obvious; [the cause] of the finding is the digging, and of the collecting of the debt the going to the market place. For neither would the former person have found [the treasure] if he had not dug, nor would the latter have collected the debt if he had not gone [there]; but since the aforementioned things are not principal (*proêgoumena*) causes of these [results] but came to be for the sake of something else, for this reason [the results] are supposed to come to be from luck. RWS

(3) Alexander *On Fate* 194,15-22

And there are some things among those that come to be that are of such a sort as to have a cause, indeed, not however one that is proper to them and primary, but [rather], as we are accustomed to say, [one that is] accidental. The finding of treasure by someone who was digging in order to plant has the digging as a cause, indeed, but it is not [a cause] proper (*oikeion*) to it and did not come to be on account of (*dia*) it. For causes in the strict sense are followed by what is caused either of necessity, as our opponents think, or for the most part; but causes that are accidental in this way rarely become causes of such things. RWS

(4) Boethius *in Int.*[2] 193,26-194,23

The Peripatetics, whose leader is Aristotle, affirm, with the weightiest authority as well as the clearest reasoning, chance, the choice associated

with free judgement (*liberi arbitrium iudicii*), and necessity in connection with things that happen and that are done. And that there is indeed chance they prove in connection with natural philosophy (*physicis*): Whenever something is done, and what comes about is not that for the sake of which the thing that was being done was begun, that which comes about must be thought to have come about by chance. So there is indeed no chance without some action; but whenever something other than what is expected comes about by means of an action that is done, the Peripatetic authority proves that it came about by chance. For if someone digging up the ground or deepening a trench in order to cultivate a field should find a treasure, then that treasure has been found by chance – not, indeed, without some action, for the ground was dug when the treasure was found; but it was not the agent's intention that he should find a treasure. Therefore, for the man who is doing something, and yet doing something else, a different thing has taken its place. This, therefore, is said to come about by chance: whatever comes about as a result of some action [but] not on account of the thing that was begun whose place will have been taken by something [else] for the agent. And this is indeed in the very nature of things, so that it is not our ignorance from which this is derived in such a way that some things would seem to be by chance because they were unknown to us, but rather that they would be unknown by us because those things that happen by chance in nature would retain no constancy of necessity or of providence. NK

Long before Boethius, Plotinus connects Aristotle's example of the chance finding of treasure with something more universal. Other things in the universe as a whole have to fall in with what the digger is doing.

(5) Plotinus 2.3 [52] 14 (17-19)

If he found treasure, we must say something from the whole universe falls in with (*sumpesein*) [what he does]. RRKS

Aristotle allows in *Phys.* 2.4-6, and Alexander repeats in the passage just cited, 194,15-22, that coincidences have accidental causes, e.g. digging, and it emerges only in *Metaph.* 6.3 that in this sort of case an accidental cause is not a cause of the coincidence. Alexander does not say this, being worried, e.g. in the last passage cited from him and its environs, *On Fate* 193,30-1, that the Stoics might charge him with postulating causeless events. But Alexander(?) *Mantissa* does say the accidental cause of coincidence is not a cause. And Proclus accuses the Aristotelians of introducing chance as something uncaused.

(6) Alexander(?) *Mantissa* 171,11-27

For when anything follows on a certain cause, the cause not existing for the sake of this thing's coming about, then what precedes is called the cause *per accidens* of this thing that followed on it, that is, not a cause. So what followed on this cause came about without a cause, for it did not do so on

account of a proper cause of its own. This, when it occurs in external causes, creates luck and the fortuitous; when in the [causes] in us, what is up to us (*eph' hêmin*).

[171,16] For nature and habit seem to be cause[s] in us of choice; but, to the extent to which there is not-being in these, to this extent [there is not-being] also in choice. And for this reason we sometimes choose those things of which the cause has not been laid down in us beforehand, on account of the weakness and slackness of mortal nature; for [otherwise] we would always be moved in a similar way in the same situations. But the nature of not-being, as I said, removes eternity and perpetual activity in the same manner from those things in which it is present. So it is those choices that we make without a cause and with no cause existing beforehand that are said to be up to us; and the opposites of these, too, are possible, as that cause has not been laid down beforehand that, if it *had* existed beforehand, would certainly have rendered it necessary that this should come to be. For this reason it often happens that some who are similar in nature and have been brought up in the same habits become different from each other, as a result of the choices that have no cause. RWS

(7) Alexander(?) *Mantissa* 172,7-12

For those choices of which nature or training or habit is the cause are said to be up to us in the sense that they come about through (*dia*) us; but those which come to be without a cause and in accordance with not-being, [these] in this way preserve what is said to be up to us in the proper sense, coming to be through weakness of nature; and that which is up to us is this, of which the opposite too could have been chosen by the one who chose this. RWS

(8) Proclus *in Tim.* 1.262,6-9

[The Aristotelians] say that whatever happens, happens, come what may, because of some cause, but they do not notice that they create an uncaused cause (*aition anaition*) when they enrol chance (*to automaton*) among the causes. For that is what chance is: the uncaused. RRKS

Reading

R.W. Sharples, *Alexander of Aphrodisias: On Fate*, London 1983, ad locc.
Richard Sorabji, *Necessity, Cause and Blame*, London 1980, ch. 1.

5(g) Fate as nature, with or without exceptions

The Stoic determinists sometimes called fate 'nature', Alexander *On Fate* 192,25-6; Stobaeus 1.79.8-12, and Alexander seized on this, because for Aristotle, nature admits of exceptions, so that he thinks this makes fate indeterministic, and is what enabled Socrates to falsify physiognomic predictions about his character. Fate is

the particular nature of particular things. Sections of the *Mantissa* which are probably not by Alexander take the same view of fate, 183,9-11; 184,7-10; 185,11-15; 186,4-9, and ascribe it to Aristotle and Theophrastus.

Iamblichus, *Letter to Sopater*, also says that the essence of fate resides in nature. But Hierocles of Alexandria *On Providence* in Photius *Biblioth.*, vol. VIII p. 192 Henry, disagrees with Alexander explicitly, as does his contemporary Proclus, *in Tim.* 3.272, 5-28, translated in the next section. The disagreement in Proclus, however, turns on the fact that nature is weak and not eternal, and can only be the substrate of Fate. Fate is better called *divinely illuminated* nature. Cf. also Proclus *On Providence* 3.11-12.

(1) Alexander *On Fate* 169,18-170,12

[Then] we are left with saying that Fate is in the things that come to be by nature, so that Fate and nature are the same thing.

For what is fated is in accordance with nature and what is in accordance with nature is fated. For it is not the case that man comes to be from man, and horse from horse, in accordance with nature but not in accordance with Fate; rather, these causes accompany each other as if differing only in name. It is for this reason, too, that people say that the first causes of the coming-to-be of each thing in accordance with nature (that is, the heavenly bodies and their orderly revolution) are also causes of Fate. For the beginning of all coming-to-be is the heavenly bodies', in their motion, being in one type of position or another in relation to things on earth.

[169,26] As fate is located in these things and is of such a nature, it is necessary that, as are the things that come to be in accordance with nature, so should those be too that come to be in accordance with Fate. But the things that come to be in accordance with nature do not do so of necessity, but the coming to be of the things that come to be in this way is sometimes hindered; for which reason the things that come to be in accordance with nature come to be for the most part, but not of necessity. For that which is contrary to nature, too, has a place in them, and comes to be when nature is hindered in its proper working by some external cause. It is for this reason that man does not come from man of necessity but for the most part, and neither does each of the things that come to be in accordance with nature always come to be in accordance with the fixed time that seems to be laid down for the things that come to be in this way.

[170,5] If there is in the things that come to be in accordance with nature that too which is contrary to nature, as also in the things in accordance with craft [that which is contrary to craft], what is contrary to Fate will also have a place in the things that come to be in accordance with Fate, so that if what is contrary to nature has a place and is not an empty expression, what is contrary to Fate, too, will have a place in the things that come to be. And for this reason one might reasonably say, too, that it is the proper nature of each thing that is its beginning and cause of the ordered pattern of the things that come to be in it in accordance with

nature. For it is from this, for the most part, that the lives of men and their deaths derive their pattern. RWS

(2) Alexander *On Fate* 171,7-17

Moreover, someone who wanted to come to the aid of those who profess the art of prophecy might give this as the cause of their not always hitting the mark: while the nature and Fate of each individual does not have a free passage in all things, but some things come to be contrary to it as well, the prophets reveal the things that come to be in accordance with Fate, as indeed do the physiognomists. At any rate, when Zopyrus the physiognomist said certain extraordinary things about the philosopher Socrates which were very far removed from his chosen manner of life, and was ridiculed for this by Socrates' associates, Socrates said that Zopyrus had not been at all mistaken; for he would have been like that as far as his nature was concerned, if he had not, through the discipline that comes from philosophy, become better than his nature. And this is, to state it in a summary fashion, the opinion concerning Fate of the Peripatetic school. RWS

(3) Proclus *in Tim.* 3.273,19-21

But Plato alone observed its basis, referring to it [Fate] as 'nature', and making it directly dependent on the demiurge. HT

(4) Iamblichus *Letter to Sopater* in Stobaeus, vol.1, p. 81, 8 Wachsmuth

The entire essence of Fate resides in nature. RRKS

(5) Hierocles *On Providence* in Photius *Biblioth.* 461b21-31 Bekker in Photius, vol. 7, pp. 192-3 Henry

Providence legislates for each species what befits it, and what follows the justice (*dikê*) that follows (*hepesthai*) this Providence is called Fate. For Fate is not the unheeding necessity of the astrologers, nor the external force (*bia*) of the Stoics, nor what Alexander of Aphrodisias thinks when he brings Fate round to being the same as the Platonic nature (*phusis*) of bodies, nor our birth for which one compensates by incantations and sacrifices, as some think. Rather, Fate is the judicial activity of God in regard to what results according to the law (*thesmos*) of Providence. This activity corrects our doings in an orderly chain (*heirmos*) attached to the decisions (*proairetikos*) of our self-determined (*autexousios*) acts as starting point. RRKS

5(h) Other accounts of fate

Fate was identified by others with the World Soul, the celestial movements, a chain of causes, or other things, as catalogued, for example, by Hierocles above, by Plotinus 3.1 [3] 2; and by the passages of Proclus and Boethius below. These identifications emphasise its inferiority to Providence. The ascription to Plato of an identification with the World Soul may be based on his *Laws*. Augustine rejects in *City of God* 5.9 the Stoic belief in fate, but in 5.8 says that sometimes the Stoics mean no more than a chain of causes dependent on God's will (he misascribes to Seneca some verses of Cleanthes), and in that case the talk of fate is merely a verbal variation. The passage is quoted above under **4(b)**.

(1) Plato *Laws* 904C6-9

Thus all things that have a share of soul change, since they have received into themselves the cause of change, and in changing they move in accordance with the order and law of fate (*heimarmenês taxis kai nomos*). RRKS

(2) Proclus *in Tim.* 3.272,5-28

With this much already established let us turn to the facts and say that Fate should neither be called the individual natural disposition, as some of the Peripatetics say, like Alexander (for this is weak and not eternal, whereas we have a prior grasp of the strength of Fate as something really big and at the ready). Nor the order of the cosmic circuits as Aristotle somewhere says when he calls surpassing their order 'surpassing their Fate', as if it depends on Fate (though the cause of the order is one thing, and the order itself another). Nor the 'soul in relation', as Theodorus says (for to start with there is no such of kind of life in the universe). Nor nature pure and simple, as Porphyry says (for many things either beyond or external to nature come to us from Fate, like noble birth, repute and riches – what sort of natural motions could be held responsible for these?). Nor the intellect of the universe as Aristotle again says somewhere, if we presume that the book *de Mundo* is his (for intellect creates all that it creates together, and does not need to go out to manage things in accordance with some cycle or continuously ordered sequence, yet this is the peculiarity of fate – the sequence of many causes, the order, and the cyclic creation). But if one is to sum up briefly the whole of its particular nature, it should be called nature with reference to its substrate, but [with the qualification that it is] god-like and filled with divine, intelligent, and psychical illuminations. HT

(3) Proclus *in Tim.* 3.273,9-12

For being dependent on the Providence of the gods and the goodness of the Demiurge, it [Fate] is given unity and directed by it, being a *logos* composed

of *logoi*, a single multi-faceted power, a divine life, and the order that precedes ordered things. HT

(4) Boethius *Consolation* 4, prose 6, section 13 Bieler, *CCL* 94

So, whether Fate is carried on by certain divine spirits which are servants of Providence, or whether the sequence of Fate is woven together through the service of the World Soul or the whole of nature, or by movements of the heavenly bodies or by the power of angels or by the varied offices of daemons, by some of these things or by all of them, what at any rate is certain is that the unmoved and single pattern of things that come about is Providence, while Fate is the moving connection and sequence in time of the things whose coming-about has been arranged by the divine simplicity. RWS

Reading

J. den Boeft, *Calcidius On Fate: His Doctrine and Sources*, Leiden 1970.
R.W. Sharples, *Alexander of Aphrodisias: On Fate*, London 1983, translation with notes.
R.W. Sharples, *Cicero: On Fate and Boethius: The Consolation of Philosophy 4.5-7; 5*, Warminster 1991, translation with notes.

5(i) The relevant cause is the human agent

Alexander substitutes the human agent as cause in place of Fate.

(1) Alexander *On Fate* 185,28-186,2

For as we do not look for any other cause, on account of which earth is carried downwards in accordance with the heaviness in it, or on account of which a living creature does what it does in accordance with impulse, because each of them contributes this cause from itself to the things that come about, being like this in nature; so neither in the case of the things that are brought about in different ways at different times by us in identical circumstances should any other cause be demanded besides the human himself. For this is what being was for a human; for [it was] to be a beginning and cause of the actions that come about through oneself. RWS

5(j) Hypothetical necessity and 'up to us'

Platonism sometimes seeks to preserve human responsibility by *restricting* the sphere of fate (*heimarmenê*), and more generally of necessity. On this view, we choose (*haireisthai, proairesis*) actions which are *up to us*, but fate then plays out the inevitable consequences. Sometimes the inevitable consequences in question are divine punishment. The initial choice is sometimes described as a hypothesis from which (*ex hupotheseôs*) the inevitable consequences of fate follow. The Christian Nemesius ascribes to Plato the view that our initial choice is exempt from

necessity, Calcidius that the opposite course is up to us and that there is no necessity. Among the Platonists, Hierocles claims that our choice is not enslaved (*adoulôtos*), pseudo-Plutarch *On Fate* that it is not in accordance (*kata*) with fate, Alcinous that it is not fated and not compelled (*katanankazesthai*). Thus there is *only* hypothetical necessity, although caution is needed because other texts do not make this assurance explicit, and in any case, a denial of fate, compulsion, or enslavement does not automatically exclude the presence of some other type of necessity. The distinction of initial choices from inevitable consequences is found in pseudo-Plutarch *On Fate* 570A-571E; Alcinous *Didaskalikos*, ch. 26; Nemesius *On the Nature of Man*, chs 37-8; Calcidius *in Tim.* 150-4, pp. 186,13-139,12 Waszink; Proclus *in Remp.* 2.357,28-359,6; Hierocles *On Providence, Fate and the Co-ordination of What is Up to us with Divine Authority*, extracts in Photius *Bibl.* 172b9ff.; 461b21-31; 463b4-10 Bekker, in Photius vol. 7 Henry. The last two at Henry pp. 192-3 and 197-8 are translated in **5(g)** above and **5(j)** below. The hypothetical view of Fate is reflected in oracles which predict only on the basis of an 'if': 'if you beget a son, he will kill you'. These hypothetical oracles are used to establish an absence of absolute necessity or fate by the Platonists Alcinous, Calcidius (*loc. cit.*), and Maximus of Tyre 13.5 (p. 164, Hobein), and by the Christian Origen arguing *ad hominem* against the Greeks, *Contra Celsum* 2.20 (*SVF* 2.957). Origen argues in the same breath that Judas was responsible for betraying Christ, despite Christ's foreknowledge (similarly *On Prayer* 6.5), but he does not restrict Christ's foreknowledge in the same way with an 'if'.

(1) Nemesius *On the Nature of Man* ch. 38, 109,17-110,9 Morani

For everything in accordance with Fate happens in accordance with Providence, but not all that is in accordance with Providence is also in accordance with Fate. But the divine law itself which he [Plato] says is both Providence and Fate includes everything in itself, some things in accordance with hypothesis (*kath' hupothesin*), others as a result of hypothesis (*ex hupotheseôs*). The divine law includes the principal causes as starting points in accordance with hypothesis, and these are up to us (*eph' hêmin*) – assents (*sunkatatheseis*), decisions (*kriseis*) and conations (*hormai*). But what of necessity follows these is from hypothesis, and the choice (*hairesis*) of things to do, which is up to us, is in accordance with hypothesis. But when what is up to us is hypothesised, what is fated follows from this as from a hypothesis. For example, sailing is posited as up to us. That is in accordance with hypothesis. Then with our sailing hypothesised, there follow in addition the results of this hypothesis, namely, being shipwrecked, or not. [109,27] And that is why he [Plato] describes as resulting from hypothesis what accompanies and follows the hypotheses which are up to us, that is the starting points and actions. He implies that the one lot are premissed and are up to us in accordance with hypothesis, while the others follow as a result of hypothesis, and are not up to us, but of necessity. For he thinks the fated is not fixed (*hôristhai*) from eternity, but supervenes on the principal [causes] which are up to us.

[110,5] In harmony with this is [Plato's] 'The responsibility belongs to the one who chooses (*helesthai*); God is not responsible' and 'virtue has no master (*adespoton*)' [*Republic* 617E], and the existence of prophecy. The

whole tendency of his discussion is to show that deliberate choices (*proaireseis*) and some actions according to deliberate choice are up to us, whereas what follows on them and the outcomes are up to Fate [and] of necessity. RRKS

(2) Hierocles *On Providence*, extracts in Photius *Biblioth.* 463b4-10 Bekker, in Photius, vol. 7, pp. 197-8 Henry

And this is fate, which leads us to the things [down] here and leads us away again from here. It is a plaiting (*plegma*) and concurrence (*sundromê*) of human deliberate choice (*proairesis*) and divine judgement (*krisis*), in such a way that we choose (*helesthai*) what we will (*boulesthai*) through the unenslaved power (*adoulôton*) of deliberate choice, but often suffer what we do not will through the infallible power of the [divine] judgement. RRKS

(3) Origen *Against Celsus* 2.20, Borret, *Sources Chrétiennes*

And in response to the Greeks we shall use what was said to Laius along the following lines, either in the [oracle's] actual words, or in words written by the tragedian [Euripides *Phoenissae* 18-20] to the same effect. This, then, is what was said to [Laius] from one who foreknew what would happen.

'Do not sow the furrow of children in violation of the divinities. For if you beget a child, your offspring will kill you, and all your household will go through blood.'

By this, then, it is shown that it was possible (*dunaton*) for Laius not to sow the furrow of children. For the oracle would not have given him an impossible command. Rather, sowing was possible, and neither [option] was compelled (*katanankazesthai*). But when [Laius] did not guard against sowing the furrow of children, it followed that he suffered as a result of his sowing the effects of the tragedy concerning Oedipus, Jocasta and their sons. RRKS

See also **Psychology 14**

5(k) Relation between fate and providence

See above **4(b)**

6. Causation

Much of what the Neoplatonists have to say about causation, unlike the contribution of the Aristotelian school, concerns the intelligible world in which the causal relations are outside time. See **Logic and Metaphysics 16(a)** and **Psychology 6(c)**, and see below in **8.** The need for the One is explained in **Logic and Metaphysics 13.**

6(a) Platonic Forms as active causes

Aristotle accuses Plato of neglecting the final and efficient causes, *Metaph.* 1.6, 988a7-14; 1.9, 991b4-5; 992a25-6; 992a29-32. The first complaint is not just, because although in *Phaedo* 99C-D Plato makes Socrates abandon his search for a purposive explanation in the physical universe, this gap is remedied in later works. For the *Republic* 502C-509C postulates the Form of the Good and the account of creation in the *Timaeus* repeatedly explains that things in the universe are as they are because that is the most elegant way. See Gregory Vlastos, *Plato's Universe*, Oxford 1975.

But as regards efficient cause, Aristotle is on better ground when he complains that the Forms would need a moving cause. Admittedly, in Plato's *Timaeus* (91B4-5), the divine Craftsman or Demiurge is a sort of moving cause, who uses the Forms as a model, when he and his divine assistants shape and animate a previously disorderly universe. But we shall see below under **8(f)** that on the face of it, divinity is not made to account for everything that happens subsequently; not, for example, for each case of an individual becoming beautiful. So on the natural interpretation of the *Timaeus* which Aristotle takes, he is right to say that efficient causality is in short supply. It took subsequent developments in Platonism to make Creation and efficient causality continuous. **8(f)** will catalogue three: (i) the interpretation that the shaping of the universe in the *Timaeus* is really meant to be beginningless and endless, (ii) the Middle Platonist view that the Forms are themselves creative thoughts in the mind of God, (iii) the interpretation that God remains the sole creator, because even now he makes the seeds unfold which, like the Stoics' seminal principles, contained the future possibilities in advance.

Even without reference to the mind of God, Forms came to be seen eventually as dynamic active beings which create the qualities we see as mere traces of their activities and create each other, with genus creating species. Plotinus' view to this effect is documented in **Logic and Metaphysics 3(m),(r),(w), 5(g).** This would seem incomprehensible if we think of Forms as still being some kind of universal, since we think of universals as being inert. But two further things happened in Neoplatonism. First, the Platonic Form came to be thought of as a less than clear example of a universal, precisely because the transcendent Form is seen as a cause. Thus Simplicius says that the Platonic Form is 'common as a cause, but not as a common nature', *in Cat.* 82,35-83,20, translated in **Logic and Metaphysics 5(a).** Secondly, for Plotinus intelligible Forms are not only objects of thought, but also thinkers. This idea is based above all on Plato *Sophist* 248E-249A which says that what has complete being must have soul, life, thought and intellect, as explained

in **Logic and Metaphysics 13**. The Aristotelian Alexander could not foresee what changes would befall the concept of Forms. Nonetheless, he feels some difficulty in Aristotle's accusing Plato of omitting final and efficient causes, and seeks to explain it, *in Metaph.* 59,28-60,2; 63,23-31.

(1) Alexander *in Metaph.* 59,28-60,2 (= Aristotle *On the Good* fr. 4 Ross)

One might ask how it is that, although Plato speaks of the efficient cause in the passage where he says, 'It is then our task to discover and to make known the maker and father of the universe' [*Tim.* 23C], and also of that for the sake of which and the end by what he again says, 'All things are with reference to the king of all, and everything is for his sake' [*Ep.* 2, 312E], Aristotle makes no mention of either cause in [reporting] the doctrine of Plato. [The reason is] either because Plato did not mention either of these in what he said about the causes, as Aristotle has shown in his treatise *On the Good*; or because he did not make them causes of the things [involved] in generation and destruction, and did not even formulate any complete theory about them. WED

(2) Alexander *in Metaph.* 63,23-31

One might ask how it is that Plato, who says in his *Epistles*, 'All things are with reference to the king of all, and all things are for his sake' [*Ep.* 2, 312E] is not, in these words, speaking of the good as end; or, if he is, how it is that Aristotle denies that he does so. Or [Aristotle may give the reason] when, speaking for himself, he says at the end of book Alpha Meizon (*Metaph.* 1), 'It is evident, then, even from what we have said before, that all the earlier philosophers seem to be seeking the [four] causes named in the *Physics*, and that we cannot name any cause apart from these. But they spoke obscurely about these causes, and in one sense they mentioned all, as we have also said before, but in another sense they did not mention them at all. For in what it says on all subjects, the early philosophy resembles one who lisps, since it is young and only beginning' [993a11-16]. WED

Reading

Gail Fine, 'Forms as causes: Plato and Aristotle', in Andreas Graeser, ed., *Mathematics and Metaphysics in Aristotle*, Tenth Symposium Aristotelicum, Bern and Stuttgart 1987.

Richard Sorabji, *Time, Creation and the Continuum*, London & Ithaca, NY 1983, ch. 17.

Gregory Vlastos, *Plato's Universe*, Oxford 1975.

6(b) Procession and reversion

For the Neoplatonists, the One beginninglessly creates Intellect, and Intellect Soul. This creation takes the form of procession (*proodos*). In other words, Intellect proceeds out of the One. But as explained for example in a passage of Plotinus

quoted below under **6(f)**, 3.4 [15] 1 (6-14), the creation is not completed without the return or reversion (*epistrophê*) of what is being created to its source.

It has been suggested (Genequand) that the Islamic concept of procession was influenced also by the earlier belief of Alexander in nature as a divine power permeating downwards from the heavens and from God, as illustrated in **1(b)**, while reversion corresponds to Aristotle's insistence that everything imitates God, Alexander *On the Cosmos* 21-3, translated in **22(e)**. Both ideas are expressed in Alexander *On the Cosmos* 127-9.

(1) Proclus *ET* 31

Everything that proceeds (*proienai*) from something reverts (*epistrephesthai*) in respect of its being to that from which it proceeds. RRKS

(2) Alexander *On the Cosmos* 127-9 Genequand

[127] Since the First Mover is as we have described it, and the things moved by it without intermediary are also in that state, there follows from the motion of these things the generation and change of the perishable bodies having matter, according to the power of those [heavenly bodies] reaching them according to [the former's] diversity, and according to the assimilation of those different things which we have mentioned, because of the change and diversity of their motion, as we said before. [128] This nature and power are the cause of the unity and order of the world. In the same way as happens in one city having one ruler residing in it, not separate from it, we also say that a certain spiritual power penetrates the whole world and holds its parts together. [129] Since the city is ruled by one authority only which is its leader or established law, so is the one world, since it is one body, continuous, eternal, imperishable, containing and encompassing all things, and comprehending them, and all things which are in it seek to be in contact with the thing which is unchangeable and aim at the material union with that which rules and governs [the world] and preserves its arrangement and order by a spiritual power which penetrates all parts of it which deserve that it should penetrate them according to what [the ruler] thinks, not the people. CG

Reading

Charles Genequand, *Alexander of Aphrodisias: On the Cosmos*, Leiden 2001, Introduction.

The motion of procession and reversion cannot be ordinary motion, as it is timeless, but it does involve power (*dunamis*). Studies of what these relations can be are to be found in the reading listed below. Despite the concern with the intelligible world, some of the insights can be applied to causation in the world of physics. The term 'emanation' for the creative process is a later one. Plotinus does not like the physical connotations of the corresponding Greek word *aporroia*.

A thing can be described as reverting to itself, as well as to its cause, and this in late Neoplatonism, is the basis of self-awareness, as illustrated under **Psychology 4**.

Reading

Heinrich Dörrie, '"Emanation", ein unphilosophisches Wort im spätantiken Denken', in K. Flasch, ed., *Parusia: Festgabe für J. Hirschberger*, Frankfurt-am-Main 1965, 119-41.

S.E. Gersh, *Kinesis Akinetos: A Study of Spiritual Motion in the Philosophy of Proclus*, Leiden 1973.

Francesco Romano and Loredano Cardullo, eds, *Dunamis nel Neoplatonismo*, Florence 1996.

Koenraad Verrycken, 'The metaphysics of Ammonius, son of Hermeias', in Richard Sorabji, ed., *Aristotle Transformed*, London & Ithaca, NY 1990, 199-231.

Proclus adds that what proceeds also in a way remains (*monê*) in its source, since it must not lose all connexion with it. Cf. Aristotle's idea that the activity of teaching, though residing in the learner, is not cut off from the teacher, *Phys.* 3.3, 202b8.

(3) Proclus *ET* 30

All that is immediately produced by any principle both remains in the producing cause and proceeds from it. For if in every procession the first terms remain steadfast [*ET* 26], and if the procession is accomplished by means of likeness [*ET* 29], like terms coming to existence before unlike [*ET* 28], then the product in some sense remains (*menein*) in the producer. For a term which proceeded completely would have no identity with that which remained: such a term is wholly distinct from the prior. If it is to be united by any common link with its cause, it must remain in the latter as we saw that the latter remained in itself. If, on the other hand, it should remain only, without procession, it will be indistinguishable from its cause, and will not be a new thing which has arisen while the cause remains. For if it is a new thing, it is distinct and separate; and if it is separate and the cause remains steadfast, to render this possible it must have proceeded from the cause. Insofar, then, as it has an element of identity with the producer, the product remains in it; insofar as it differs, it proceeds from it. But being like it, it is at once identical with it in some respect and different from it: accordingly it both remains and proceeds, and the two relations are inseparable. ERD

Damascius is rightly worried that, if the created thing remains, it does not need to revert to its source. He thinks the spatial language inadequate to express the closeness of the relation between the producer and product.

(4) Damascius *On First Principles* Westerink-Combès 2,123,13-22; 2,124,18-20

Grant, then, that there is procession itself and there is remaining itself, and that one is always naturally bound to the other, as has been said. But why is reversion added on top of these? What is it and what need does it meet for what has proceeded? That it serves what has proceeded is obvious,

for it is thought to be a going back, and all going back belongs to what has proceeded, since what need is there of a return to the original for what has not yet proceeded but remains in the original? For remaining is better than reverting and why should what has the better need the worse? ...

But if what has proceeded also remains, as has been shown, why does it need to revert, since in remaining it is already assimilated [to its source]? RRKS

Reading

John Dillon, 'Damascius on procession and return', in John Cleary, ed., *The Perennial Tradition of Neoplatonism*, Leuven 1997, 369-79.

A.C. Lloyd, *The Anatomy of Neoplatonism*, Oxford 1990, 128.

6(c) Causation without events or beginning in Platonism

Causal relations in the Neoplatonist intelligible world are eternal and Augustine reveals that Platonism had refuted the idea, still popular nowadays, that causation requires events and a beginning, by using the example of a footprint beginninglessly imprinted in the dust. A cushion would have been a better example than dust, since the causality would be established by the fact that the cushion *would* spring back to shape, if the foot ever *were* removed.

(1) Augustine *City of God* 10.31 Dombart and Kalb, *CCL* 47, pp. 308,7-309,18

Yet Plato most clearly says of the world and of the gods which he writes were created in the world by God, that they had an origin and originated, but he asserts that they will endure for ever through the most powerful will of the Creator (*Timaeus* 41A-D). But [the Platonists] have found a way of understanding that origin as being an origin not of time but of dependence. 'For', they say, 'if a foot had always been from eternity in the dust, it would always have had a footprint under it, but no one would doubt that the footprint was made by that tread, and that neither preceded the other, even though one was made by the other. 'That', they say, 'is how the world too and the gods created in it both existed always, since their maker existed always, and yet were made'. RRKS

Reading

Richard Sorabji, *Time, Creation and the Continuum*, London & Ithaca, NY 1983, 307-12.

6(d) Six types of cause in Neoplatonism

Aristotle postulates four causes; or types of explanatory factor, in *Physics* 2.3. The final cause is a thing's purpose. The efficient is closest to our cause, and is sometimes translated 'productive', when the effect is a thing's existence rather than a change in its properties. The material cause is that 'out of which' something comes, especially its matter. The formal cause is a thing's defining characteristics,

normally excluding the matter. (Olympiodorus' example of form below is confusing: I suggest 'drawing board'.) Of the six causes ascribed by the Neoplatonists to Plato, four correspond to Aristotle's four causes. Of the remainder, instrumental and paradigmatic, the latter corresponds to Plato's Forms viewed as paradigms, or models. Seneca already describes five of the six causes, *Ep.* 65,4-16, partly translated in **Logic and Metaphysics 5(c)**. The sixth, instrumental, cause appears in Galen *On Antecedent Causes* 6.63-4. Aristotle had already compared his material cause with an instrument, *GA* 5.9. See further Hankinson (in *Reading*, below).

(1) Proclus *in Tim.* 1.263,19-30

Since these are the causes of the cosmos, the final, the paradigmatic, the productive, the instrumental, the formal, the material, he himself will reveal the final cause to us later as it comes to light from his account and his demonstrations, but he will communicate the instrumental, material, and formal from the axioms which are stated previously. For if the universe is not being but becoming there is [following Festugière] a form which is participated in by matter, and the immediate motive principle of these. He reveals the productive principle as a result of what has just now been said (for if the universe is something that comes to be, there is a certain productive cause of it), and the paradigmatic cause from what will be said next (for if the world is beautiful it has arisen with reference to an eternal paradigm). HT

(2) Olympiodorus *in Gorg.* Proem 5,1-6,1 Westerink

Since we have referred to principles and constitutional organisation, come, let us speak about principles generally and about constitutional happiness, and describe the principles of constitutional craft. There are six principles of each thing: matter, form, productive cause, paradigm, instrument, end. As *matter* for a builder there is his wood; as *form* there is the drawing board or some such thing; the *productive cause* is the builder himself; the *paradigm* is what he had derived his mental plan from before building; as an *instrument* he may have a saw perhaps or an axe; the *end* is that for which it has been brought into being. The majority of orators – those who do not look to the truth – say that the matter of constitutional [happiness] is the living body, the form is indulgence, the productive cause is rhetoric, the paradigm is tyranny – for just as tyrants rule everybody, they say, so one should gain mastery in this case too – the instrument is persuasion, and the end is pleasure. That is what these people say.

[5,15] We say that the *matter* [of constitutional happiness] is the *soul* – not the rational soul, but the tripartite soul, for it resembles the division of the city. And just as in cities there are ruler, soldiers and also the labouring class, so too in us: to the ruler there corresponds our reason, and to the soldier high spirit (*thumos*), which is intermediate in as much as it obeys reason, but instructs and organises the labourers, i.e. appetite (*epithumia*). So the matter is this tripartite soul, because the statesman wants to have high spirit and appetite as and when they are necessary or appropriate.

For just as the octave [note] is in tune with the lower note and emits the same tone, only sharper, so too appetite is conjoined with reason.

[5,26] The *form* [of constitutional happiness] is *justice* and *temperance.* The *productive cause* is the *philosophical life. The paradigm* is the *cosmos,* since the statesman arranges everything with his eye on the universe, which is brimming with order, for Plato called the universe 'arrangement', not 'disarray'. And habits and education are the instrument. And the end is the good. And note that the good is double, one part going with us as we mature, and the other as we decline. The former is the *political* good, the latter the *contemplative* good. RJ, KL, HT

Reading

Cosmin Andron, *Knowledge and Reality in Damascius,* PhD diss., University of London, in preparation.

R.J. Hankinson, 'Galen's theory of causation', *Aufstieg und Nidergang der römischen Welt* 2.37.2, 1994, 1757-74.

Lucas Siorvanes, *Proclus,* Edinburgh 1996, 88-91.

6(e) Three of these are merely cooperative causes

The same doctrine is in Proclus *in Tim.* 1.2,1-3,20; 1.17,15-18; 3.126,11-14. According to Proclus *in Tim.* 1.3,14-19; 1.3,33-4,2 matter and enmattered form are found only in the perceptible cosmos.

(1) Proclus *in Parm.* 983,1-3 Cousin

For the true (*hôs alêthôs*) causes of beings are the paradigmatic, the productive (*poiêtika*) and the final [*teleia kai* Cousin, *telika* Westerink]. RRKS

(2) Simplicius *in Phys.* 3,16-19

Among sources (*arkhai*) there are causes (*aitia*) properly so-called and cooperative causes (*sunaitia*). Causes according to [the physicists] are the productive (*poiêtikon*) and final (*telikon*), cooperative causes the form, the matter and in general the elements. Plato adds to the causes the paradigmatic (*paradeigmatikon*) and to the cooperative causes the instrumental (*organikon*). RRKS

(3) Simplicius *in Phys.* 316,22-6

The phrase 'more or less' is added because although there are just this number of causes in the strict sense, there are many incidental types of cause, as he will say, or else because he has spoken cautiously, since Plato numbered the paradigmatic cause along with the causes in the strict sense, the productive and the final, and the instrumental along with co-operative (*sunaitia*) causes, the material and the formal. BF

(4) Proclus *in Tim* 1.3,14-19

It is appropriate, then, that all these [causes] have been handed down after their accurate examination by Plato, and attached to them the remaining two causes, form (*eidos*) and substrate. For this world [of ours] is not the same as the intelligible and intellective worlds, which consist in pure Forms (*eidê*), but something exists in it as rational principle and form (*eidos*) and something as substrate. RRKS

6(f) Need cause have the same qualities as effect?

It may seem that a clear example in Aristotle of cause not being like effect is his divine mover of the heavens, who is *unmoved*, but Aristotle explains *GC* 1.6, 323a25-34, that the unmoved mover 'touches' the heavens only in the way that the person who grieves us 'touches' us, and in *Metaphysics* 12.5, 1072b3, that he moves the heavens as the beloved moves the lover by inspiring motion, i.e. as a *final* cause. Elsewhere we do find an unmoved object of perception moving the perceptual faculty of the soul as *efficient* cause, *DA* 3.12, 434b27-435a10, but Philoponus calls this moving a mere awakening (Philoponus *in DA* 110,18-36) and awakenings of faculty and object turn out to be *mutual*, Aristotle *DA* 3.2, 426a15-26. More relevant is the fact that the soul in Aristotle acts as unmoved *efficient* cause of motion, *DA* 1.2, 403b29-31; 1.3, 406a3-8; b7-8; 1.4, 408b5-18; *Phys.* 8.5, 258a7.

Aristotle also sees that hardness may be produced by what is not hard nor even soft, but e.g. cold – there is no need to alter his text – and Philoponus comments on the point. In such cases the cause must still be in an actual state, e.g. actually cold, but there need not be even a genus in common, unless it be at the more remote level of being material properties, or unless being in an actual state is treated, as in Philoponus, as a sameness of genus. Alexander and Simplicius give the further examples of rubbing producing heat and a whip producing weals.

Philoponus, however, goes on to qualify the point that cold can produce hardness, by saying that it does so only indirectly, or *per accidens*, by working on the heat in the body and hence on its fluidity. Philoponus *in DA* 332,5-22, translated under **23(d)**(6), gives another example of cause being unlike effect. The sun, on Aristotle's view is not hot, being made of the fifth element, but this would not stop its activity, viz. light, heating the air by arousing the natural heat in the air.

The principle that cause must be greater than effect is accepted by Alexander, but only with a restricted application, because it is taken by him to imply a degree of similarity.

(1) Aristotle *GC* 1.5, 320b17-21

One thing comes to be *simpliciter* from another, as has been determined elsewhere, and is brought into being by something in an actual state which is either of the same genus or, like fire by fire or a human by a human, of the same species. Or it is brought into being by something in an actual state [sc. but with no closer relationship], since hard is not brought into being by hard [sc. nor even by soft]. RRKS

(2) Philoponus *in GC* 84,3-13

'A hard thing', he says, 'is not caused to come to be by a hard thing', which makes it clear that what causes it is not something of the same species, but a cold thing – if this is in fact how it comes about – by solidifying it; and that is something of the same genus as the thing which is coming-to-be, in that it is cold in actuality in the same way as that [sc. the hard thing] is hard in actuality. So in this way it is caused to come to be by something of the same genus, since [it is caused to come to be] by that which exists in actuality. For the efficient cause, whatever it may be, in every way actually is. Those plants which grow spontaneously do not owe their coming-to-be to an efficient cause of the same species, but to something which exists in actuality and which in this way is of the same genus. The creative rational principles, which exist in actuality, are the causes of the things which grow spontaneously. And white is not caused to come to be from white (as in thousands of similar cases), but from something which exists in actuality. CJFW

(3) Philoponus *in GC* 146,30-147,4

For neither does hard act upon soft, nor above on below, nor in general white on black, nor every contrary on every contrary, but those contraries act upon and are affected by each other which have the power to affect other things (hot and cold above all are of this kind), whilst those things which act and are affected and which have the same proximate matter are in all cases contraries. I add 'proximate' because cold works upon softness. For the soft is made hard by cold, e.g. wax, or by heat, e.g. clay, and obviously it is neither the case that cold is contrary to the soft that is in wax, nor heat to that which is in clay, nor in general that heat or cold is contrary to softness. They do not act on the soft immediately, because they act immediately on the contraries. For the cold works upon the heat that is in the wax, draws it out and dissipates it, and evidently some wet substance, in which the heat actually has its being, is drawn out and dissipated with it. In this way it comes about that the wax is impacted and becomes hard. So the cold works immediately on the heat and because of this on the wetness, and thus finally *per accidens* on the softness. CJFW

(4) Alexander *in Metaph.* 147,15-28

Aristotle explains the reason for this when he says, 'A thing has a quality in a greater degree than other things if in virtue of it the same quality belongs to the other things too.' for that through which things are the kind of thing they are, and in virtue of which they have the same name and nature (*sunônumôs*) as one another – e.g. hot things – [must itself possess that quality in a greater degree]. For it is necessary not only that these things should have the same nature as one another, but also that the cause

of their being such should also have the same nature as they; for a thing will itself be in the greatest degree what [other things are] when it is the first thing of this sort. Thus, e.g., the cause of the fact that hot things are hot will be hot in the greatest degree if it is itself the first hot thing; it is in this way that fire is the cause of heat in things that are hot. For Aristotle makes this point clear by saying, 'that in virtue of which [the same quality belongs to the other things too]' [*Metaph.* 2.1, 993b24-5], since something can cause other things to be the kind of thing they are without itself being of that kind – rubbing, for instance, is the cause of heat in things, but is not the cause of their heat in the sense that it is hot in the greatest degree. But fire, since it is the cause of heat in hot things because it is itself also hot, is for this reason hot in the greatest degree. WED

(5) Alexander *DA* 88,26-89,4

For in all cases, what is a certain kind of thing most of all and in the principal sense is also an *explanans* of others' being this sort of thing. For what is visible most of all (and light is this sort of thing) is also an *explanans* of other visible things' being visible; and again, what is good most of all and primarily is also an *explanans* of other goods' being this sort of thing, for other goods are judged by their contribution to this. VC

(6) 'Simplicius' *in DA* 120,31-4

It is clear that [the productive cause] is 'in act' that character that the thing acted on is at one time in potency, but later becomes in act, given that by being affected it becomes like what acts on it. But neither does rubbing contain heat, although it produces it, nor does a whip contain weals. For the productive need not undergo what it produces, but be active, and in that way the productive is in act like what is brought about in what is acted on, not as being affected but as being active. For not only according to Plato but also according to Aristotle, the forms of things brought about are anticipated in the productive cause, not, obviously, as being affected but as active and essentially in those beings where activity is identical with essence. CS

Plotinus accepts the principle that cause is greater than effect, but does not take it to imply similarity of cause and effect, at least in the case of the One, because the One is beyond actuality, life or form, yet produces these in Intellect, without having them itself.

The same is true at a lower level. Soul in plants has the power of growth, but what it produces is body, which is lifeless. Even with fire, the heat it spreads is different from the heat integral to it. Proclus, and Porphyry as reported by Proclus, agree: the Demiurge's Reason is not extended, but is able to produce the extended physical universe. Porphyry compares what can be produced by the very small extension of a seed, but under **7(a)** below we shall see that Gregory of Nyssa offers an alternative to Porphyry, that the physical universe is really a bundle of ideas.

Under **4(e)** we saw that for Plotinus what is harmonious and good at a higher level of reality, like the ingredients in a seed, may at a lower level be disharmonious and evil, 3.2 [47] 2 (16-31); 4.4 [28] 39 (27-9).

(7) Plotinus 6.7 [38] 17 (3-14; 39-42)

It is not necessary that one should possess what one gives. Rather, we should think in such cases that the giver is greater, and the given less than the giver. For that is what coming into being is like for things which have being. First, there must be something in a state of actuality, and the subsequent things must be in potentiality what comes before them. The first is beyond the secondary things, the giver beyond the given, because it is superior. If, then, there is something prior to actuality, it is beyond actuality, and so beyond life. If, therefore, there is life in the Intellect, the giver gave life, but is itself more beautiful and estimable than life. The Intellect, therefore, possessed life, without need of any complexity in the giver, and life is a trace (*ikhnos*) left by the giver, but [there is] not life in the giver.

... The Intellect therefore is itself a trace of the One. But though it is a form and is spread out (*ektasei*) and multiplied, the One is without shape or form; for that is how it produces form. If it were itself a form, the Intellect would have been its *logos*. RRKS

(8) Plotinus 4.4 [28] 11 (14-17)

For one should not think that because what is produced is varied and diverse, the producer too must follow along with the changes in what is produced. The producer is as unchanging as what is produced is varied. RRKS

(9) Plotinus 5.4 [7] 2 (26-39)

But how is it that when [the intelligible] remains the same, [intellect] comes into being?

The answer is that in each thing there is one activity of the essence and another proceeding from the essence. The first is each thing itself in actuality, the second is what is derived from it, different from it but of necessity bound to accompany it. Just as in the case of fire there is a heat which brings its essence to completion and another which is derived from it when the fire is active according to its essence, by enduring as fire; so it is in the case under discussion – even more so: it endures 'in its own character', and from the perfection and activity inherent in it the generated activity gains substantial being (*hupostasis*) as from a great power, the greatest of all, and proceeds to Being and substantial existence (*einai, ousia*). For that was beyond Being, the potential of all things, while the other was now all things. BF

(10) Plotinus 3.4 [15] 1 (5-12)

Does this [power of growth] generate nothing? It generates something entirely different from itself, for there is no longer life after this, but what is generated is lifeless. What is it then? Just as everything that was generated before this was generated shapeless, but was given form by reverting to what generated it as if nourished by that, so also in this case what was generated is no longer a kind of soul, since it is no longer alive, but is absolute indefiniteness. RRKS

(11) Proclus *ET* 18

Everything which by its existence bestows a character on others itself primitively possesses that character which it communicates to the recipients. For if it bestows by mere existence, and so makes the bestowal from its own essence, then what it bestows is inferior to its essence, and what it is, it is more greatly and more perfectly, by the principle that whatever is productive of anything is superior to its product. Thus the character as it pre-exists in the original giver has a higher reality than the character bestowed: it is what the bestowed character is, but is not identical with it, since it exists primitively and the other only by derivation. For it must be that either the two are identical and have a common definition; or there is nothing common or identical in both; or the one exists primitively and the other by derivation. But if they had a common definition, the one could not be, as we have assumed, cause and the other resultant; the one could not be in itself and the other in the participant; the one could not be the author and the other the subject of a process. And if they had nothing identical, the second having nothing in common with the existence of the first, could not arise from its existence. It remains, then, that where one thing receives bestowal from another in virtue of that other's mere existence, the giver possesses primitively the character which it gives, while the recipient is by derivation what the giver is. ERD

(12) Porphyry *ap.* Proclum *in Tim.* 1.396,3-26, translated below under **7(a)**

The material cause is actually unlike what comes out of it:

(13) Philoponus *Contra Proclum* 449,13-16

Quite the reverse, everything that comes into being does so from something unlike itself: bronze from non-bronze, water from non-water, human from non-human, I mean in respect of the material cause. RRKS

(14) Philoponus *Contra Proclum* 450,2-8

So if in respect of the material cause everything that comes into being does so from what is unlike itself, as human from non-human, fire from non-fire, knower from non-knower, then, whether it is the form or compound that comes into being, nothing that comes into being needs something like itself in order to come into being. RRKS

There is a related issue, whether agent needs to be like patient. Aristotle cites the views of his predecessors. Apart from Democritus, he says, *GC* 1.7, 323b1-15, they had supposed that like is unaffected by like. With Democritus, cf. Plato *Tim.* 57E-58A. Aristotle's own view, in *On the Soul* 2.5, 417a17-20; *GC* 1.7, 323b29-324a14; *Phys.* 3.2, 202a9-13, is that agent and patient start off unalike, but finish up alike. 'Philoponus', however (who may be Stephanus), points out that in the same chapter Aristotle distinguishes the soul's faculties as not really being patients, when they are activated, but rather being fully realised then. He infers that there are many cases in which something is brought to perfection without becoming like the agent of the perfecting process. Becoming like, he says, is not possible when activator and activated do not have the same matter. In addition, such activation could at most affect only the activity, not the substance, of intellect.

(15) 'Philoponus' *in DA 3* 526,28-527,5

That solution is provided from outside [Aristotle's works]. But Aristotle states another solution, which he also gives elsewhere [Aristotle *On the Soul* 2.5, 417b2-16]. There are two ways of being affected, one perfective and the other destructive. In the case of the one that is destructive, the statement stands firm that what is affected comes to be like the agent. But when intellect knows sense objects it undergoes a perfective affection which is rather to be called 'being unaffected' than 'being affected'. So again intellect is not affected. For things that are perfected by something do not have to be also of the same matter as it. For see! The cosmos is perfected by the Creator, and does not come to be of the same matter as he. Again, things here are arranged and made perfect by the heavenly bodies, and are not of the same matter as they.

Again, air is made perfect by light and is not of the same matter as light. So intellect too undergoes from sense objects that affection which is perfective, and being made perfect by them is not of the same matter as they. It should be noted that even if we say it undergoes an affection which is perfective, it is not the substance of intellect that the affection touches, but its activity. That is the second problem and its solution. WC

For the Epicureans (Epicurus *Letter to Herodotus* in Diogenes Laertius *Lives* 10.67; Lucretius 3.161-7) and the Stoics (Nemesius *On the Nature of Man* 2, 21 Morani = *SVF* 1 Cleanthes 518), the soul must be corporeal because it interacts with body. The Stoics distinguished the thing acted on from the effect; a flame and a log are both bodies, whereas effects are incorporeal predicates like being burnt. Simplicius objects to the requirement that agent and patient should both be corporeal, since

he believes that the incorporeal can act on the corporeal, and one should not expect the same principles to hold for corporeal and incorporeal causation.

(16) Simplicius *in Cat.* 217,32-6

The Stoics say that the qualities of bodies are corporeal, those of incorporeals incorporeal. But they slip up by thinking that causes must be of the same substance as their effects and by postulating the same account of causation for bodies as for incorporeals. RRKS

John Dillon has shown that Plotinus was worried, like a good number of modern philosophers, as to how interaction was possible between two things so different as the mental and the physical. He suggests in 4.4 [28] 23 (18-28) that when physical objects act on our senses, the effect must be a proportional mean (*meson analogon*) intermediate between the sensible perceived and the soul, which is an intelligible. This develops the more aporetic thought earlier in 3.6 [26] 1 (31-4) that the perceptual process might seem to require another kind of intermediate: affectless affects and irrational rational principles. The whole idea, that an intermediate is required for causal relations between entities that are insufficiently alike, is used by the Neoplatonists at higher levels too. The soul is itself intermediate between sensible and intelligible. And the triads, which proliferate increasingly in later Neoplatonism, provide an intermediate as the middle member of the triad, which sometimes performs the same bridging function, although sometimes (see **Logic and Metaphysics 15(c)**) the causal relations can be more complex than expected. Dillon points out that in 4.4 [28] 28-9 what is acted on by sensibles in perception is not soul, but rather a trace (*ikhnos*) of soul which is intermediate insofar as 4.4 [28] 29 treats it as akin (*oikeios*) to body.

(17) Plotinus 4.4 [28] 23 (18-28)

So there must not only be these two things, the external object and the soul, or else the soul would not be affected. Rather, what is going to be affected must be a third thing, that is, what is going to receive the form (*morphê*). So it must be affected together with and in the same sort of way as [the external object] and be of one matter with it, and it must be affected, while the other [the soul] has cognition. And it must be affected in such a way as to preserve something of what has acted on it, without being the same thing. But since it is between what has acted and the soul, it must undergo an effect that lies between perceptible and intelligible as a proportional mean (*meson analogon*) somehow joining the extremes to each other, receiving and announcing at the same time, and fitted to become like each of the two extremes. RRKS

(18) Plotinus 3.6 [26] 1 (31-4)

And whether the essence of soul is numerical [sc. a proportion], or a rational principle (*logos*), as we say, how could the undergoing of an effect take place in a numerical entity or in a rational principle? We ought rather

to think that irrational rational principles (*logoi alogoi*) and affectless affects (*apathê pathê*) come upon the soul. RRKS

(19) Plotinus 4.4 [28] 29 (1-7; 12-15)

Well then, if body is like something warmed but not like something illuminated, how does it have nothing living (*zôtikon*) about it, when the other soul has gone out of it? It does have it for a short time, but it fades quickly, as with things warmed when they have got distant from the fire. Evidence is the hair that sprouts on corpses and the nails which grow, and animals which move for a long time when cut in two. ...

Does [the living element], then, go away together with [soul], or does it perish? We ought to ask this both about the light [after the sun goes] and about the life (*zôê*) in the body which we say is akin (*oikeios*) to body. RRKS

Reading

John Dillon, 'Plotinus, the first Cartesian?', *Hermathena* 149, Winter 1990, 19-31, repr. in John Dillon, *The Great Tradition*, Aldershot 2000.
A.C. Lloyd, 'The Principle that the cause is greater than the effect', *Phronesis* 21, 1976, 146-56.
C. Rutten, 'La doctrine des deux actes dans la philosophie de Plotin', *Revue Philosophique*, 146, 1956, 100-6.
F.M. Schroeder, 'The analogy of the active intellect to light in the "De Anima" of Alexander of Aphrodisias', *Hermes* 109, 1981, 215-25.
F.M. Schroeder, 'Conversion and consciousness in Plotinus', *Hermes* 114, 1986, 186-95.
Lucas Siorvanes, *Proclus*, Edinburgh 1996, 94-5.
Richard Sorabji, *Time, Creation and the Continuum*, London & Ithaca, NY 1983, 315-16.

6(g) Agent and patient have a single action located in the patient

This is the causal theory of Aristotle, borrowed by the Neoplatonists from *Phys.* 3.3. Aristotle there maintains that the activity of the teacher is located in the learner, and in a way identical with the learner's activity, though not in definition the same. This enables him elsewhere to locate the activity of the divine prime mover in the universe which he moves, as Simplicius notes, *in Phys.* 442,18, commenting on 202a30. It helps Philoponus to argue for his impetus theory *in Phys.* 385,4ff which has the transmitted impetus located *within* the thing moved, **22(f)(v)**. It is also the basis for the seminal view that intellect is identical with its objects, discussed in **Psychology 3** and **4**, and **Logic and Metaphysics 15(c)** and **17**.

(1) Aristotle *Phys.* 3.3, 202a13-21; b5-22

And the question raised is obvious: change resides in what is changed, since it is the actualisation of that produced by what can cause change. And the actuality of what can cause change is nothing different. It must be the actualisation of both, since a thing can cause change by being potential, and does cause change by being actual, and what it actualises is the thing

changed. So there is one actualisation of both alike, as the same interval is one to two and two to one, and what is uphill is downhill. For these are one, even though their definition is not one. Similarly too in the case of what causes change and what is changed. ...

Rather it is not strange that the actuality of one thing should reside in another. For teaching is the actuality of the one who can teach, but it resides in something and is not cut off (*apotemnesthai*), but is the actuality of this in this. Nor does anything prevent there being one and the same actuality of the two things, not in such a way that their being is the same, but as the potential is related to the actual. Nor is it necessary that the person teaching should be learning, not even if acting and being acted on are the same. They are the same not by way of the definition that tells the essence being one and the same, like 'mantle' and 'cloak', but as the road from Thebes to Athens and from Athens to Thebes are the same, as said before. To things that are in some way or other the same not all the same properties belong. That happens only with things whose being is the same. Nor, even if teaching is the same as learning, is to be learning the same as to be teaching, just as, even if the distance between separated things is a single distance, to be distant from over here is not one and the same thing as to be distant from over there. In general, it is not in the strict sense that teaching is the same as learning, and acting as being acted on. What is the same is the change to which acting and being acted on are attached, since being the actuality of this in this and being the actuality of this produced by this are different in definition. RRKS

This theory is echoed by Plotinus, who takes Aristotle to mean that the activity of teaching, though in the learner, is not 'cut off' from the teacher. See further **2** above. It is also, as shown by Wolff, adapted by Philoponus so as to apply to his impetus theory, according to which things can be moved by a force implanted into them from an external mover. Philoponus also uses the Neoplatonist idea of *monê*, remaining, but diverges by locating the *monê* in the thing moved, not in the source.

(2) Plotinus 6.3 [44] 23 (13-20)

So where is the motion to be found when it is moving something else and thereby progressing from an inherent potentiality to an actuality? Is it in the mover? If so, how will whatever is moved and so affected participate in it? Or is it in what is moved? If so, why does it come but not remain in it?

The answer is that it must not be separated from the agent, but not be present in it; it must pass from the agent to the patient, but must not be cut off (*apotemnesthai*) in it, but rather go from one to the other like a gust of wind. BF

(3) Philoponus *in Phys.* 384,11-385,11

This, then, is what is found in Aristotle [202b21], but someone may perhaps inquire if the account that locates change only in the subject of change and

not at all in the cause of it is true of every cause and subject of change. And in the case of change of quality or size it really is the affected subject and not the agent that undergoes change (for what becomes white is not what whitens but what is whitened, and what increases is not what causes increase but what suffers it, that is, not the agent but the affected subject), but in the case of change in place, where certain causes of motion cause motion by being moved, the account will not seem to apply. For if the heavens move the fiery sphere [below them] by being moved, how could I deny that the cause of motion, insofar as it moves, is also moved itself, and that the changes also are two, one of the cause of motion and one of the subject of motion. And there is one kind of motion of the heaven, another according to which things here are moved when they suffer qualitative change of one sort or another as a result of the motion of the heaven. So that there are two activations (*energeiai*) and two changes, not only in the definition but also as to the substratum. And while the fiery sphere undergoes the same motion as the cause of its motion (just as when I move, my cloak undergoes the same motion with me), not only do the neighbouring regions undergo this change when the heavens move, but all things in common undergo the qualitative change. For the sun's change in place just in as much as it changes place, is the cause of one qualitative change or another in things here.

[384,29] But regarding this difficulty, I briefly say here that Aristotle does not say that none of the causes of change cause change by undergoing it (he did at least say clearly that all things natural are such as not to be able to cause a change except by suffering change themselves); but that the power of change (*kinêtikê dunamis*) imparted by the cause to the subject of change, I mean the force (*iskhus*) and activation in respect of which it is changed, as being changeable in potentiality and completed by an actuation of this sort – this power, while being one and the same, has the beginning of its procession (*proodos*) from the cause of change, but has its end, its completion and (as it were) its resting place (*monê*) in the subject. For once it has come to be in what has potential being, it does not abandon it, but, as it were, rests (*menein*) in it and completes it, and the bringing forth of the potentiality is a completion, and this is change.

[385,4] For the man of understanding advances his theorems even if there is no one to learn, but when they are advanced within the learner and work upon him, I say that this working power by which he is affected is one and the same, having originated in the teacher but come to be in the learner, and having changed him and completed what is in him potentially, which power is obviously in the subject and not in the cause of change. For the cause of change did not suffer change in respect of it. RRKS

Reading

Jean Christensen de Groot, 'Philoponus on *De Anima* II 5, *Physics* III 3, and the propagation of light', *Phronesis* 28, 1983, 177-96 at 186-7.

A.C. Lloyd, *The Anatomy of Neoplatonism*, Oxford 1990, 99-100.

J.E. McGuire, 'Philoponus on *Physics* II', *Ancient Philosophy* 5, 1985, 241-67, 258-9.
C. Rutten, 'La doctrine des deux actes dans la philosophie de Plotin', *Revue Philosophique* 146, 1956, 100-6.
Michael Wolff, 'Philoponus and the rise of pre-classical dynamics', ch. 4 in Richard Sorabji, ed., *Philoponus and the Rejection of Aristotelian Science*, London & Ithaca, NY 1987, 110-11.

6(h) Only incorporeal things are causative

Cf. under **7(a)**. In making only incorporeal things causative, Proclus draws on Plato's treatment of soul as opposed to body in *Phaedrus* and *Laws*.

(1) Plato *Phaedrus* 245C5-246A2

Socrates: All soul is immortal. For what is always in motion is immortal. But that which moves something else and is moved by something else, when it ceases from motion, ceases from life. Now only that which moves itself, inasmuch as it does not abandon itself, never stops moving, and is also the source and principle of motion for all other things which move. And no principle is generated. For it is necessary that everything that is generated is generated from a principle, and that the principle is not generated from anything. For if the principle were generated from something, it would no longer be a principle. And since it is ungenerated, it is also necessary that it does not admit destruction. For if a principle is destroyed, neither will it be generated from anything, nor will anything else be generated from it, given that it is necessary that all things are generated from a principle. Thus that which moves itself is the principle of motion. And this can be neither destroyed nor generated, or else the whole heaven and the whole earth will collapse into one and be at rest, and will never again have anything by which things will be generated through being moved. And since that which is moved by itself has been declared immortal, one will not be ashamed to say that this very thing is the essence and definition of soul. For all body whose motion comes from outside lacks soul, whereas all body whose motion comes from within itself is ensouled, since this is the nature of soul. And if this is so, that which moves itself is none other than soul, soul would of necessity be ungenerated and immortal. RW

(2) Plato *Laws* 896A3-B8

Kleinias: Are you saying that the same entity which we all call 'soul' by name has as its definition self-motion?

Athenian: I am. And if this is so, do we still regret that soul has been inadequately demonstrated to be the same as the primary source of generation and motion of all things which are and have come to be and will be, and in turn of all the opposites of these, given that it has turned out to be the cause of change and motion for all things?

Kl: No. Soul has been most adequately demonstrated to be the most venerable of all things, since it turns out to be principle of motion.

Ath: Then is the motion which comes about through something else and in something else, but makes nothing move within itself, not secondary and as far down the scale as anyone might wish to rank it, being change of a truly unensouled body? RW

(3) Proclus *ET* 80

The proper nature of all bodies is to be acted upon, and of all incorporeals to be agents, the former being in themselves inactive and the latter impassible; but through association with the body the incorporeal too is acted upon, even as through partnership with incorporeals bodies too can act. For body, *qua* body, has no character save divisibility, which renders it capable of being acted upon, being in every part subject to division, and that to infinity in every part. But the incorporeal, being simple, is impassible: for that which is without parts cannot be divided, and that which is not composite is not subject to change (*ET* 48). Either, then, there is no active principle or the incorporeal is such, since body, *qua* body, is not an agent but is subject only to being divided and acted upon.

Again, every agent has an active potency; but body in itself is without quality and without potency: Therefore it cannot act in virtue of being body, but only in virtue of a potency of action residing in it – that is, it acts, when it does act, by participation of potency. Further, even incorporeals participate passive affections when they come to be in a body, because they are then divided along with their bodies and feel the effect of the divisible nature of the latter, although in their own being they are without parts. ERD

Reading

Jonathan Barnes, 'Immaterial causes', *Oxford Studies in Ancient Philosophy* 1, 1983, 169-92.

In the rival tradition of the Giants of Plato's *Sophist* 247D-E that only body can act or be acted on, consider the view of the Stoics, e.g. Diogenes Laertius 7.55; Sextus Empiricus *Math.* 8.263; *PH* 3.38. Similarly the Epicureans: Epicurus *Letter to Herodotus ap.* Diog. Laert. 10.67; Lucretius 3.161-7; 1.418-48.

I am indebted to Inna Kupreeva for pointing out that Alexander takes Aristotle to have a third position. Things are causative only thanks to their incorporeal qualities. She compares the Platonist reply to Stoics at Plutarch *Com. Not.*1080E-F.

(4) Aristotle *Sens.* 441b12-15

It is not in their nature *qua* fire and earth to act on or be acted on by anything, nor [is it in the nature of] anything else [*qua* what it is]. But it is *qua* having a contrariety of qualities in itself that everything acts and is acted on. RRKS

(5) Alexander *in Sens.* 73,18-21

One can gather from this [*Sens.* 441b12-15] Aristotle's opinion about what acts and is acted on. For he does not think, as the Stoics hold, that it is bodies that act and are acted on, nor again that it is incorporeals, as Plato and his followers thought, but that things act and are acted on in virtue of (*kata*) the contrary qualities in them, which are incorporeal. RRKS

Reading

Inna Kupreeva, 'Qualities and bodies: Alexander against the Stoics', *Oxford Studies in Ancient Philosophy* 25, 2003, 297-344.

6(i) The higher cause embraces and empowers lower causes

Proclus applies this principle to the One, which both gives power to lower entities and directly produces matter, which is lowest and powerless.

(1) Proclus *ET* 56-7

All that is produced by secondary beings is in a greater measure produced from those prior and more determinative principles from which the secondary were themselves derived. For if the secondary has its whole existence from its prior, thence also it receives its power of further production, since productive powers reside in producers in virtue of their existence and form part of their being. But if it owes to the superior cause its power of production, to that superior it owes its character as a cause insofar as it is a cause, a character meted out to it from thence in proportion to its constitutive capacity. If so, the things which proceed from it are caused in virtue of its prior; for the same principle which makes the one a cause makes the other an effect. If so, the effect owes to the superior cause its character as an effect. Again, it is evident that the effect is determined by the superior principle in a greater measure. For if the latter has conferred on the secondary being the causality which enabled it to produce, it must itself have possessed this causality primitively [*ET* 18], and it is in virtue of this that the secondary being generates, having derived from its prior the capacity of secondary generation. But if the secondary is productive by participation, the primal primitively and by communication, the latter is causative in a greater measure, inasmuch as it has communicated to another the power of generating consequents.

[57] Every cause both operates prior to its consequent and gives rise to a greater number of posterior terms. For if it is a cause, it is more perfect and more powerful than its consequent [*ET* 7]. And if so, it must cause a greater number of effects: for greater power produces more effects, equal power, equal effects, and lesser power, fewer; and the power which can produce the greater effects upon a like subject can produce also the lesser, whereas a power capable of the lesser will not necessarily be capable of the

greater. If, then, the cause is more powerful than its consequent, it is productive of a greater number of effects.

But again, the powers which are in the consequent are present in a greater measure in the cause. For all that is produced by secondary being is produced in a greater measure by prior and more determinative principles [*ET* 56]. The cause, then, is co-operative in the production of all that the consequent is capable of producing. And if it first produces the consequent itself, it is of course plain that it is operative before the latter in the activity which produces it. Thus every cause operates both prior to its consequent and in conjunction with it, and likewise gives rise to further effects posterior to it.

[Corollary] From this it is apparent that what Soul causes is caused also by Intelligence, but not all that Intelligence causes is caused by Soul: Intelligence operates prior to Soul; and what Soul bestows on secondary existences Intelligence bestows in a greater measure; and at a level where soul is no longer operative, Intelligence irradiates with its own gifts things on which Soul has not bestowed itself – for even the inanimate participates Intelligence, or the creative activity of Intelligence, in so far as it participates Form.

Again, what Intelligence causes is also caused by the good, but not conversely. For even privation of Form is from the Good, since it is the source of all things; but Intelligence, being Form, cannot give rise to privation. ERD

6(j) Same circumstances, same outcome

See above under **5**.

6(k) Sympathetic causation and other causal forces in an ensouled universe

See **Psychology 18(e)** for Plotinus ascribing to sympathy, erotic magic and the efficacy of prayer and for Iamblichus agreeing on the first, not the second.

(i) Influence of the stars

(1) Plotinus 4.4 [28] 8 (52-61)

If [the heavenly bodies] live a blessed life, inwardly contemplating their existence by means of their own souls; and if by this tendency in their souls towards unity and the outpouring of light from them to the whole of the heavens the whole of the heavens and its parts are moved in this way – just as the strings of a lyre, when struck in consonance, produce a sound in natural harmony; if the firmament itself is carried along on its own path and its different members are each carried differently along the same path (since each has a different position); if all this is so, then there would be

even more strength in our account of its single life, a life of even greater consistency throughout. BF

(2) Plotinus 4.4 [28] 35 (40-4)

[The sun's] activities such as warming things here on earth and all that follows from that spring from itself to the limit of its powers by the transmission of soul – and the power of productive soul is great. Each [heavenly body] by its outpouring of light transmits a power in the same way without any act of choice. BF

(ii) Spells and harmful effects (also prayer)

Cf. **4(e)** above.

(3) Plotinus 4.4 [28] 41 (1-12)

But the sun and other stars do not hear [prayers]. Prayer is answered because one part is in sympathy with another, as if they were on a single taut string, which when plucked at one end vibrates at the other. Often too when one string is plucked another sounds in accord with it as if sensing the vibration, because they are in a single attunement. If one lyre even picks up the vibration from another because of sympathy, then there is surely a single attunement in the universe, even if it is composed of contraries. And it is in fact composed of like parts that are all akin even if they are contraries. Anything that harms a man, such as his spirited element when it is drawn along with the gall and enters the liver, does not intend to harm him; it is as though someone, kindling one fire from another, were to burn someone else [text becomes corrupt from this point]. BF

(4) Plotinus 4.4 [28] 38 (7-11)

But any harmful influence on the propagation of living creatures that is said to come from the stars is in fact due to the inability of the subject to receive what is beneficial. For whatever happens doesn't just happen – it happens to something specific in a specific way. BF

(iii) Treatment of universe as ensouled organism

(5) Plotinus 4.4 [28] 32 (10-25)

The things that participate in [All Soul pure and simple] are entirely parts of it, while those that participate in some other phase of it thereby do not possess the quality of being parts of it *tout court*, but even so, so far as they possess something of it, and in respect of what they possess, they are affected by the other parts. This unity is sympathetic throughout like a

single living being; the furthest parts of it are close at hand. Just as in the case of an individual creature the claw, the horn, the finger and any other part may not be contiguous and what lies between them may not suffer the affection – but the remoter part does. For similar parts may not be placed in contiguity but be separated by what comes between – but they are affected sympathetically because of their similar nature, and what is done by a non-adjacent part necessarily reaches the remoter part. Since it is a living creature forming a unity, no part is so remote as not to be close at hand because of the sympathetic nature of the single living creature.

So that which has a similarity to what is affecting it suffers no alien affection; but when what affects it is dissimilar, then what is affected feels something alien and disagreeable. BF

(6) Plotinus 4.4 [28] 33 (11-41), translated also under **Psychology 14(b)**

The limbs of the person dancing each figure are bound not to remain in the same position; his body moves and twists in accordance with the dance, with one leg taking the weight and the other relaxing, one feeling the strain and the other resting. The purpose (*proairesis*) of the dancer is directed elsewhere, and his limbs submissively follow in the service of the dance and join in bringing it to its completion. The expert could say how any figure is achieved when this limb is stretched and that one bent, this one pulled in, that one concealed. The dancer does not choose (*proaireisthai*) such movements at random, but because any one limb, if it is to play its part, has its required position as the entire body performs the dance.

So it is in this way that we should say that the heavenly bodies act (or give signs) – or rather that the entire universe brings its entire life into activity, eternally moving and changing the configuration of its larger members; the relationship of these members to each other and to the whole, and their different positions cause the rest to follow them as if a single living creature were in motion. The rest are as they are because of these relationships, positions and configurations – now in one state, now in another; but it is not the bodies which are configured that cause this, but what configures them. But what configures does not cause something other than itself by affecting something else, for it does not act on anything other than itself, but is itself everything that comes into being, both the configurations in the upper world and the effects down here which necessarily follow those configurations in the living creature which is moved in this way, a living creature composed in a particular way and naturally compounded, both affected and affecting itself of necessity. BF

(7) Plotinus 4.4 [28] 35 (40-4), translated under **6(k)(i)**

(8) Plotinus 4.4 [28] 36 (1-15)

The universe contains great variety; all the forming principles are in it, and

its powers are boundless and varied. In the human being, they say (although unless one has studied the subject one cannot know properly), the eye has one power and each bone has its power – for example the bone in the hand and the bone in the foot; there is no part of us which does not have its own particular power. It is even more so the case in the universe at large, since the human is a faint image of the universe. In the universe there is an inexplicable and miraculous variety of powers, especially in the heavenly bodies. For it cannot have become a cosmos like some lifeless building, albeit a huge and complex structure made up of many easily specified elements such as stone or timber and anything else you care to name, but it is awake throughout, alive in all its various parts; there is nothing that can exist which is not present in it. BF

(iv) How powers extend even to bodies

(9) Plotinus 4.4 [28] 37 (11-26)

So we must admit that some irrational power is possessed by each thing which has been moulded and shaped within the universe, receiving a share of soul from the ensouled whole, embraced by it as something ensouled, part of the ensouled – since there is nothing in the universe which is not part of it. Some things however have a greater power of acting than others, both on earth and more so in the heavens, since heavenly bodies enjoy a purer nature. Many things come into being because of these powers, but not through any choice (*proairesis*) on the part of what appears to be the sources of production (for there can be power even in what exercises no choice); they do not direct their attention downwards as they bestow their power, even if some element of soul proceeds from them. An animal does not choose to produce an offspring, nor is it diminished by, or even necessarily aware of, the birth. For the power of choosing, if it were to possess it, would be inoperative, or else would not be the causative factor. And if it had no sort of choice, even less would it have awareness. BF

(10) Plotinus 4.4 [28] 35 (65-9)

In subjects there are powers other than figures; in bodies in our world there are many which are not produced by hot and cold things, but by what comes into being because of different qualities, given their form by forming principles, sharing in the power of Nature – just as the natural properties of stones and the activities of plants produce many marvels. BF

7. Idealism: Bodies as Bundles of God's Ideas

A Berkeleian kind of idealism, according to Sorabji, was introduced by the Christian Gregory of Nyssa, to answer the problem discussed by one of the Greek philosophers he had read, Porphyry: how can the immaterial produce a material universe? Porphyry's answer was that the patterns or principles (*logoi*) in seeds are unextended causes of extended bodily parts. Gregory's different answer is that the material universe is not material in quite the way one might have supposed, for bodies are bundles of God's ideas (*ennoiai, noêmata*), and so can be produced by an immaterial God. The evidence is presented by Sorabji in *Time, Creation and the Continuum*, ch. 18 and *Matter, Space and Motion*, ch. 4. Baladi pointed out that Berkeley's *Siris* shows (also) the influence of Plotinus, since Berkeley there switches from treating matter as an invention of philosophers to treating it, like Plotinus, as a shadow. Indeed, as Dillon stresses, Berkeley refers to Plotinus explicitly.

Only in the third passage of Gregory cited, the one from *de Hominis Opificio*, does Gregory suggest that any material substratum enters into the bundle of which he is speaking. When he speaks in the first passage from *in Hexaemeron* of matter being constituted of ideas, he means by matter no more than *body*.

That Gregory can in the fourth century AD present a version of idealism better known from Berkeley in the eighteenth century illustrates an important fact about the history of philosophy, that the same theory can be advocated for quite different reasons, without ceasing to be the same theory. In fact, Berkeley himself gave Gregory's reason (*Third Dialogue Between Hylas and Philonous*), without mentioning Gregory. But the reason to which he gives more prominence is a different one, concerning the sceptical question: 'if we can only know ideas in the mind, how can we know about bodies?'. The answer is that if bodies simply are bundles of ideas, we shall be able to know them. According to a very interesting argument (Burnyeat), this idealist theory could not have been offered as an answer to scepticism, until Descartes had changed the nature of scepticism in the seventeenth century. However that may be, it nonetheless remains the case that the very same theory was offered both by Berkeley himself, and fourteen centuries earlier by Gregory, as an answer to a completely different question about causation: how can an immaterial God produce a material world? In the interim, Avicenna in the early eleventh century produced an idealist theory for an entirely different reason again, to explain how the very physical next life promised in the Koran to non-intellectual people, could be produced in a spiritualist way as projections of their imaginations (Jean Michot, *La destinée de l'homme selon Avicenne*, Leuven 1986). Berkeley's idea that what is not perceived does not exist is not articulated by Gregory, but it is by Augustine *Soliloquies* 2.5.7.

(i) Porphyry's analogy of the seminal *logoi* in a seed

Cf. Plotinus 3.2 [47] 2 (18ff.), Porphyry *Sent.* 37, Augustine *De vera rel.* 29.

(1) Porphyry *ap.* Proclum *in Tim.* 1.396,3-26

So if human crafts, and the imaginative faculties of individual souls, and the activities of daemons manage such things, why is it remarkable that the Demiurge should make complete provision, by his very intellective act, for the founding of sensibles, summoning forth without matter that which is enmattered, generating without touch that which is touchable, and extending without partition that which is divided? And one ought not to be surprised that something which is immaterial and without extension should be the foundation of this universe. For we presume surely that human semen, with a mass just so big and all the principles (*logoi*) within it, is the foundation of such a vast number of distinctive features. It is the foundation of the hard bits like bones, some solid some hollow; of the soft bits like lung and liver; of the dry bits like nails and hair; of the liquid bits like blood and phlegm; of the rich bits like marrow and soft fat; of the bitter bits like bile; of the neutral bits like saliva; of the dense bits like sinews; of the bits spread out, like membranes. That is because all these things, the homogeneous parts and those composed somehow from them, are rooted in this tiny mass, or rather in no mass at all, because it is the principles that generate them, and these are in every case without mass. For whatever bit of sperm you take you will find all of them in it. Therefore so much the more is the Demiurgic principle able to summon forth all things, requiring nothing from matter for their existence, just like the principle in the semen. The latter is not outside matter, but the founder of the universe rests within himself eternally and has produced all things from himself while remaining [in himself]. HT

(ii) Gregory's idealism: the material world is a bundle of God's thoughts

(2) Gregory of Nyssa *in Hex. PG* 44, 69B-C

This being so, no one should still be cornered by the question of matter, and how and whence it arose. You can hear people saying things like this: if God is matterless, where does matter come from? How can quantity come from non-quantity, the visible from the invisible, something with limited bulk and size from what lacks magnitude and limits? And so also for the other characteristics seen in matter: how or whence were they produced by one who had nothing of the kind in his own nature? ... By his wise and powerful will, being capable of everything, he established for the creation of all the things through which matter is constituted (*di' hôn sunistatai*): light, heavy, dense, rare, soft, resistant, fluid, dry, cold, hot, colour, shape, outline, extension. All of these are in themselves thoughts (*ennoiai*) and bare concepts (*noêmata*); none is matter on its own. But when they run together (*sundramein*), they turn into matter (*hulê ginetai*). RRKS

(3) Gregory of Nyssa *de An. et Res. PG* 46, 124B-D

The corporeal creation is thought of in terms of properties which have nothing in common with the divine. And in particular it produces this great difficulty for Reason (*logos*), if one cannot see how the visible comes from the invisible, the solid and resistant from the intangible, the limited from the unlimited, or what is in every way circumscribed by quantitatively conceived proportions from what lacks quantity and magnitude, and so on for everything which we grasp as connected with corporeal nature. But we can say this much on the subject: none of the things we think of as connected with body is on its own a body – not shape, not colour, not weight, not extension, not size, nor any other of the things we think of as qualities (*poiotês*). Each of these is a principle (*logos*), but their concurrence (*sundromê*) and union with each other turns into a body (*sôma ginetai*). So, since the qualities which fill out (*sumplêrômatikos*) the body are grasped by the mind and not by sense perception, and the divine is intelligent, what trouble is it to create the concepts (*noêmata*) of intelligible things (*noêta*) whose concurrence (*sundromê*) with each other produces corporeal nature for us? RRKS

(4) Gregory of Nyssa *de Hom. Opif.* 24, *PG* 44, 212D-13B

There is an opinion about matter which seems not irrelevant to what we are investigating. It is that matter arises from (*hupostênai ek*) the intelligible (*noêtos*) and immaterial. For we shall find all matter to be composed of (*sunestanai ek*) qualities (*poiotês*) and if it were stripped bare of these on its own, it could in no way be grasped in definition (*logos*). Yet each type of quality is separated in definition (*logos*) from the substratum (*hupokeimenon*), and a definition (*logos*) is an intelligible not a corporeal way of considering (*theôria*) things. Thus, let an animal or a log be presented for us to consider, or anything else which has a corporeal constitution. By a process of mental division we recognise many things connected with the substratum and the definition (*logos*) of each of them is not mixed up with the other things we are considering at the same time. For the definitions (*logoi*) of colour and of weight are different, and so again are those of quantity and of distinctive tactile quality (*idiotês*). Thus softness and two-cubit length and the other things predicated are not conflated with each other, nor with the body, in definition (*kata ton logon*). For the explanatory formula (*hermêneutikos horos*) envisaged for each of these is quite distinctive (*idios*) according to what it is, and has nothing in common with any of the other qualities which we connect with the substratum. If, then, colour is intelligible and so is resistance and quantity and the other such distinctive (*idiômata*) properties, and if upon each of these being removed from the substratum, the whole definition (*logos*) of body would be removed: what follows? If we find the absence of these things causes the dissolution of body, we must suppose their concurrence (*sundromê*) is what

generates material nature. For a thing is not a body if it lacks colour, shape, resistance, extension, weight and the other distinctive properties, and each of these properties is not body, but is found to be something other than body corresponding to what distinguishes (*idiazein*) it. Conversely, then, where these properties run together (*sundramein*) they produce material reality. Now if the conception (*katanoêsis*) of these distinctive properties is intelligible (*noêtos*), and the divine is intelligible in its nature, it is not strange that these intellective (*noeros*) origins for the creation of bodies should arise from an incorporeal nature, with the intelligible nature establishing the intelligible powers, whose concurrence (*sundromê*) brings material nature to birth. RRKS

Reading

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8. Creation of the Material Universe

It is natural in a Christian culture, to assume that God must be a creator. But Aristotle's God was a thinker, not a creator. Aristotle and the Neoplatonists agreed that the physical universe was beginningless, but the Neoplatonists nonetheless saw Deity as the beginningless cause of its existence, and eventually (see **8(c)-(d)**) ascribed this view to Aristotle himself. They differed from Christianity not only in denying a beginning, but also in making the creation an unintended, though inevitable, effect of Deity.

8(a) Creation as assembling of God's ideas

See under **7(a)**.

8(b) Senses of 'generated' which do not imply a beginning in time

Although the Neoplatonists took the physical universe of Plato's *Timaeus* to be beginningless, Plato himself says at *Timaeus* 28C1-2 that everything perceptible is coming into being and generated (*gignomena kai gennêta*). So the occurrence of 'generated' (*gennêta*) at *Timaeus* 28C2 was explained by reference to six meanings of the cognate term *genêtos*, which do not imply a beginning. The most straightforward sense (Taurus' fourth) is that of being beginninglessly caused to exist. Four meanings were supplied by the Middle Platonist Taurus and two by Porphyry. Philoponus reports all this, in order to argue on the other side that Plato's creator did give the physical universe a beginning, following in this the interpretations of Aristotle, of the Aristotelian Alexander, and of the Middle Platonists Plutarch and Atticus, but with the different motive of making Plato's creator like the Christian God. Philoponus quotes Alexander's lost *in Cael.* commentary at *contra Proclum* 211,26-222,17.

(1) Taurus *ap.* Philoponum *contra Proclum* 145,13-147,25

It being a matter of debate whether the world-order is in Plato's view ungenerated, philosophers have had different opinions on the matter. Aristotle states that the *Timaeus* describes the world-order as generated since Timaeus says that it has come to be [*Tim.* 28B]. And, indeed, there is a work of his [sc. of Timaeus] in circulation on the universe as [something] generated. And perhaps Plato's Timaeus means much the same thing when he says that the world-order is generated. Theophrastus, on the other hand, in *On Physical Opinions*, says that the world-order is in Plato's opinion generated and criticises him on that basis, but adds that he may be representing it as generated for the sake of clarity [of exposition]. And

some others have likewise been of the opinion that it is in Plato's view generated, although others [have thought that he held that it is] ungenerated. Since those who claim that it is generated have, amongst many other passages, seized upon the one where he says 'It [*Tim.* 28B] has come to be; for it is visible and tangible', we must distinguish the various senses of 'generated' (*genêtos*). And when we do this, we shall learn that Plato is not using 'generated' in the sense in which we describe things that have come into existence from some beginning in time as generated; it is referring the word 'generated' to this sense whenever it is used that has led the majority of people astray.

[1] [146,8] Amongst things that are said to be generated, then, are things which have not come to be but which are in the same genus as things which are generated. In this sense we describe as visible things which have not, are not, and will not be seen, but which are in the same genus as visible things, as, for example, something corporeal at the centre of the earth.

[2] [146,13] Also described as generated are things that are notionally (*epinoiai*) composite, even if they have not [actually] been put together. In this sense the middle note of the scale is compounded of the highest and the lowest; even though it has not [actually] been put together [from them], we detect in it the value that they have relative to each other. And the same applies to flowers and animals. Composition and blending can be seen in the world-order in so far as we can reduce it to the first substrate [sc. prime matter] by excluding and separating off its qualities.

[3] [146,20] The world-order is said to be generated because it is always in the process of coming to be, changing, like Proteus, into all sorts of shapes. Earth and [the other] components of the world-order below the moon are continuously changing into each other, while the parts above the moon, although they are more or less unvarying in their matter and undergo very little change, change in their outward appearance, just as a mime, remaining one and the same person, takes on many different appearances depending on what he is miming. Thus even the heavenly bodies change and form different patterns with the movement of the planets relative to the fixed stars and of these relative to the planets.

[4] [147,5] [The world-order] may also be described as generated because its being is [derived] from another source, namely from God, by whom it has been fashioned. In this sense, even for those for whom the world-order is quite definitely everlasting, the light that the moon gets from the sun is generated, even though there has never been a time when it has not been illuminated by it.

[147,9] If anyone wishes to say that it is in [any of] these senses that the world-order is generated according to Plato, let him, but not if he means in [5] the temporal sense and that it originally did not exist but later came into being. [Plato] himself shows how he should be understood when he says [*Tim.* 28B] '[whether it has always been,] without any beginning, or whether it has come to be from some beginning'. The 'without any' and 'some' make it clear that he does not mean us to understand a beginning

in time in the way that we say that Ephorus began his history with the return of the Heraclidae. Others claim that the beginning associated with creating (*kata to dêmiourgoun*) is of a different kind; the creator, the model (*paradeigma*) and matter are, [they hold], beginnings. But these cannot properly be called beginnings. Moreover, he does not say 'and is body' but 'and has body', indicating that it can be described as generated because its nature is of a kind, [namely] corporeal, whose being consists in coming to be. MS

(2) Porphyry *ap.* Philoponum *contra Proclum* 148,7-15

And Porphyry adds other senses of 'generated' to those enumerated by Taurus. He says that things which have a notional generation (*to logon ekhon genêseôs*) are said to be generated even though they have never [actually] come to be; examples are words and syllables, which can be broken down into letters or assembled from them, and diagrams, like those of rectilinear figures, which are notionally divided into triangles and constructed from triangles. MS

(3) Porphyry *ap.* Philoponum *contra Proclum* 148,25-149,6

In addition, Porphyry says that things which owe their existence to a process of generation and coming into being are also said to be generated, like a house or a ship or a plant or an animal. For this reason we do not describe a flash of lightning or a snapping of the fingers or anything else that exists and ceases to exist in an instant as generated; as Aristotle also says [not an exact reference; for Aristotle's doctrine references are collected in Sorabji, *Time, Creation and the Continuum*, p. 11, n. 1], all such things come into existence without a process of generation and switch to non-existence without a process of passing away. MS

Reading

M. Baltes, *Die Weltentstehung des platonischen Timaios nach den antiken Interpreten*, vols 1 and 2, Leiden 1976-8.

Koenraad Verrycken, 'Philoponus' interpretation of Plato's cosmogony', *Documenti e studi sulla tradizione filosofica medievale* 8, 1997, 269-318.

8(c) Aristotle's God gives existence as well as motion to the universe

Aristotle's God, unlike Plato's, is, as remarked above, a thinker, not a creator. He only causes the heavens to rotate, acting as a final cause (*telikon*) whose continuous thinking inspires them. Yet already Dexippus points out that this (by producing seasonal rainfall, etc.) gives form and life to some things. Proclus complains *in Tim.* 1.267,4-268,24, that Aristotle should on his own principles have made God a creator. Proclus' pupil, Ammonius, was much more friendly to Aristotle and wrote a whole book to show that Aristotle actually did make his God a productive

(*poiêtikon*) cause, meaning not only an efficient cause, but a cause of existence, not merely of movement. Simplicius summarises many of the arguments, and this harmonisation of Aristotle with Plato helped (cf. **Psychology 12**) to make Aristotle acceptable to thirteenth-century Christianity. Simplicius, *in Phys.* 1359,1-3, and Averroes both think that Alexander already understood Aristotle in the same way as Ammonius does. But at *DA* 89,9-19, Alexander says no more than that God gives being to intelligibles, translated in **Psychology 3(g)**. Simplicius may have wrongly inferred Alexander's attitude from Ammonius' taking the view to be Aristotelian. As for Averroes, Taieb Farhat, to whom I owe both references, argued at a conference in 1993 that Averroes was relying on the misattribution to Alexander of an Arabic translation of Philoponus *Contra Proclum* pp. 238-42 Rabe.

(1) Ammonius *ap.* Simplicium *in Phys.* 1361,11-1363,12

As for Aristotle, no one disputes that he calls God or the prime mover a final cause (*telikon*). But that he also calls God a productive cause (*poiêtikon*) is sufficiently shown, I think, by his designating as productive cause that whence comes the origin of change in his distinction of causes in the second book of the *Physics* [2.3,194b29-32]: 'Again that whence comes the first origin of change or stability, as the adviser is a cause, or the father of the child and in general the maker of what is made.' What could be said clearer than this, to show that the prime mover is a productive cause?

[1361,18] And in the first book of *On the Heavens* [1.4, 271a33] Aristotle said clearly that neither God nor nature does anything in vain.

[1361,19] In the same book he said [1.9, 279a2] 'Eternity (*aiôn*) got its name from its being always (*aei einai*), immortal and divine, so that on it depend (*exêrtêtai*) the being and life of other things, of some in fuller detail, of others more obscurely.' And it is clear that just as everything gets its good through the final cause, so it gets its being and life through the Demiurgic cause.

[1361,24] He showed in the first book of *On Generation and Corruption* that the prime mover is also a productive cause, when he inquired into the reasons for continuous generation and wrote [*GC* 1.3, 318a1]: 'One cause is that whence we say the origin of change comes' – he clearly means by this the productive cause – 'and one is matter. It is the latter sort that we must discuss, because we have discussed the former already in the treatise *On Motion*, and said that one thing is unmoved throughout all time and another is always being moved.' Thus he too says that the productive cause is twofold: that which is unmoved is the cause of everything, while the heavens are the cause of sublunary things. Alexander explains these words and says, 'the prime mover is the productive cause of the movement of the divine body, a body which is itself ungenerated'.

[1361,33] In Book Alpha Major [1.4, 984b15] of the *Metaphysics* Aristotle praises Anaxagoras, and Hermotimus before him, because they not only gave material causes of the universe, but also saw Intellect as a productive

and final cause. He writes: 'When someone said that Intellect was present in nature, just as in animals, and was the cause of the cosmos and of all order, he seemed like a sober man beside the random talk of his predecessors.' So after saying that Anaxagoras and before him Hermotimus touched on these explanations, he adds [984b20]: 'Those who made these suppositions postulated that the cause is at once an origin of goodness in things and the sort of origin from which change comes to things.' Thus he praises those who posited Intellect as both final and productive cause, just as a little earlier [1.8, 989b15] he praised Anaxagoras because he called Intellect the origin of movement and kept it impassive and unmixed.

[1362,11] Alexander and certain other Peripatetics believe that Aristotle thinks there is a final cause of the heaven and one which moves it, but not a productive cause of it, as was shown by the text cited a little earlier from Alexander who says: 'The prime mover is the productive cause of the movement of the divine body, a body which is itself ungenerated.' So come let us show that Aristotle thinks Intellect is the productive cause of the heaven itself.

[1362,16] This fact alone would be enough, that he defines productive cause as that whence comes the origin of change, and that he calls Intellect, or the unmoved cause, that whence immediately comes the origin of the celestial motion. (For it is the unmoved that is the origin, via the motion of the heaven, of the motion of sublunary things too.)

[1362,20] But besides in the second book of the *Physics* he says that luck and spontaneity (*tukhê, to automaton*) are accidental causes which supervene on Intellect and nature, the causes that are in themselves productive. 'Both', he says [*Phys.* 2.6,198a2], meaning luck and spontaneity 'belong to the mode of causation called whence-comes-the-origin-of-change'. And he adds [198a5] this: 'Spontaneity and luck are the causes of things which might have been caused by intellect or nature, but which have in fact resulted from some accidental cause arising. But nothing that is accidentally such is prior to what is in itself such, [so that neither is an accidental cause prior to a cause in itself]. So spontaneity and luck are posterior to intellect and nature. In that case, however much spontaneity might be the cause of this heaven, intellect and nature must be a prior cause of our universe and of many things in it besides.'

[1362,30] Against this some disputatious person may perhaps take refuge in saying that Aristotle is not showing by this that Intellect and nature are causes of the heaven, but only that he who says spontaneity and luck are efficient causes of the heaven will be forced to make Intellect and nature prior causes. The objector should reflect that what is moved by something else must also get its existence from elsewhere, if being is superior to moving.

[1363,4] And if, according to Aristotle, the power of any finite body is itself finite, clearly whether it be a power of moving or a power that produces being, then, just as it gets its eternal *motion* from the unmoved

cause, so it must receive its eternal *being* as a body from the non-bodily cause.

[1363,8] My teacher Ammonius wrote a whole book offering many proofs that Aristotle thought God was also a productive cause of the whole cosmos, a book from which I have here taken over some items sufficient for present purposes. More complete instruction on the subject can be got from there. RRKS

(2) Asclepius *in Metaph.* 44,32-37

Plato named all such things Ideas, calling them creative rational principles (*dêmiourgikoi logoi*), and saying that from them things here come into being by participation, and from what is beautiful without qualification comes what is beautiful here, and from that good, good here, and from that human, human here. And you yourself say this, Aristotle, when you say [*Metaph.* 12.10, 1075a11, 1075a11-15 as an analogy for God] that order in the camp does not come spontaneously (*apo t'automatou*), but from the commander. RRKS

(3) Dexippus *in Cat.* 40,28-41,3

However, I do not think that we should sidestep thus a course of argument well suited to the present occasion, but rather take our start from the philosophy of Plotinus itself and set the present course of argument in the context of his overall position. For he postulates one single genus of substance in the intelligible realm as being a common source of being to the incorporeal forms and thus bestowing being on the whole sensible realm and on the forms in matter. But if this is the case, and the first principle of substance extends the same through all, having a primary, secondary and tertiary level, in accordance with which it provides being to some primarily and to others in another mode – so, if everything relates back to it as dependent on it [*êrtêsthai*, Aristotle *Metaph.* 12.7, 1072b14], then the sketchy account (*hupographê*) presented here [by Aristotle] can be seen as indicating also the first principle from which this has fallen into this lowest manifestation. JD

(4) Dexippus *in Cat.* 41,7-18

Well now, in dealing with this problem, I will base myself on what is said in [Aristotle's] *Metaphysics* [cf. 12.1, 1069a30ff.]. For there are these two substances according to Aristotle, the intelligible and the sensible, and median between those two the physical; the sensible is the composite (*sunthetos*), the physical that characterised by form and matter, and that which is higher than these is the intellectual and incorporeal, which he often calls unmoved but motive, as being the cause of motion which gives form and life (*eidopoieisthai kata tên zôên*). For this is what Aristotle lays

down about these substances in Book 12 of the *Metaphysics*, and here he subsumes the multiplicity of substances under Substance in general. He brought them all together into one system and traced them back to one originating principle (*arkhê*). For it will hardly be that anything else would participate in unity, if substance itself, which has its being in the One, is to be denied that completeness which is attributable to unity. JD

Reading

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C. Steel, 'Proclus et Aristote sur la causalité efficiente de l'intellect divine', in J. Pépin, H.-D. Saffrey, eds, *Proclus, lecteur et interprète des anciens*, CNRS, Paris 1987, 213-25

8(d) Infinite power argument for Aristotle's God giving existence

Ammonius' last argument at Simplicius *in Phys.* 1363,4 turns on infinite power. Syrianus and his pupil Proclus complained that what Aristotle says in *Physics* 8.10 about the infinite power needed to produce motion without beginning or end ought to have been applied also to existence without beginning or end. Aristotle argued that the infinite power needed to produce infinite motion could not be housed in a body, since all bodies are finite, and so must be an immaterial power, viz. God. Ammonius, the pupil of Proclus, claimed that the application of this argument to infinite existence was not merely something Aristotle should have seen, but something he actually intended. He meant his God to be equally the cause of infinite existence. The discussion is sometimes couched in terms of God being not only a final cause inspiring the heavens to move by way of emulation, but also a *poiêtikon* (productive) cause. The term *poiêtikon* evokes both Aristotle's efficient, as opposed to his final, cause, and the idea that what is caused is not only motion, but also existence.

(1) Syrianus *in Metaph.* 117,25-118,11

But he [Aristotle] is so far from being able to say anything against the true view of Plato that, whether he agrees or denies it, he is compelled to pronounce the same as Plato in a different way. For his separated forms are final causes desired by all things and are causes of the good and of cosmic order among [text?] things. And it is clear to anyone who considers with understanding what is said, that they would also be productive (*poiêtika*) causes of things here. For it is not different things that cause being and form on the one hand and finality (*teleiotês*) on the other. And if the celestial bodies also have infinite power through their desire of those things, either they got the desire and infinite power from themselves, or both, or at least the second, are supplied from those things. But they could not themselves be causes of infinite power in themselves, since the power of anything finite is itself finite. And whether both or only the second come from there, they are what supply natural and everlasting power and are causes of being to the things empowered, which would have actually ceased to be, if they were not receiving power from there.

8(d) Infinite power argument for Aristotle's God giving existence

[118,6] And that is why Plato said that the whole heaven and all coming into being would have collapsed and come to a halt, if there were not the incorporeal form which converges on itself and first acts on itself and then arouses and stirs also what depends on its beauty. This is how Aristotle's separated forms evidently possess the productive cause, whether this is acknowledged by him or denied. RRKS

(2) Proclus *in Tim.* 1.266,28-268,6

The Peripatetics say that there is something separate from matter, but it is not a productive cause (*poiêtikon*), only a final. And this is why they also removed the paradigms [sc. Forms] and set at the head of all things an Intellect without multiplicity. Plato, however, and the Pythagoreans hymned the Demiurge of the universe as something separate [from matter], far removed, the creator (*hupostatês*) of everything and providence of all.

[267,4] This is the most reasonable view. For if the cosmos loves the Intellect, as Aristotle himself says, and moves in relation to it, from where does it get this desire? Since the cosmos is not the first of things, it must get this desire from a cause which moves it to love. Aristotle himself says that the object of desire moves the thing that desires. If that is true, and the cosmos by its very being and nature desires the Intellect, clearly it gets all its being from the same source as its desiring.

[267,12] But from where does it get its movement *ad infinitum* seeing that it is finite? For as Aristotle says, all body has finite power. From where, then, does the universe get this infinite power of being, if it is not in Epicurus' way spontaneously (*ek t'automatou*)?

[267,16] To speak generally, if the Intellect is the cause of the infinite, uninterrupted and unitary *motion*, there is some productive cause (*poiêtikon*) of the eternity. And if so, what prevents the cosmos also being eternal and derived from a cause – the Father? It obtains (*lambanei*) the infinite power by which it moves *ad infinitum* from the thing it desires. In just the same way, everything shows that it will obtain its infinite power (*dunamis*) of *existing* from there, because of the argument which says that an infinite power never exists within a finite body. Either, then, it does not have a power that keeps it together at all (but how could that be? For anything divisible has something indivisible that holds it together, as Aristotle himself says somewhere [cf. *DA* 1.5, 411b5-8]. And the universe is a living animal, since at least he himself says that God is an eternal living animal [*Metaph.* 12.7, 1072b29; *Cael.* 2.3, 286a9; *Top.* 5.1, 128b19], and every animal is held together by the life in it). Or as an alternative the cosmos has a power that holds it together, but only a finite one. But that is impossible, for the power would run out, if it is finite. Or it has a power that is infinite, and again it would get this not from itself. Something else, then, will give (*didonai*) it the power of existing, and will give it not all at once, since it would not be capable of receiving it (*dektikon*) all at once. It

will give it, then, in the amounts it can take (*lambanein*), in a stream that flows and ever flows on to it (*epirreon*). No wonder the cosmos is for ever coming into being and never has being. RRKS

(3) Ammonius *ap.* Simplicium *in Phys.* 1363,4-12

And if, according to Aristotle, the power of any finite body is itself finite, clearly whether it be a power of moving or a power that produces being, then, just as it gets its eternal *motion* from the unmoved cause, so it must receive its eternal *being* as a body from the non-bodily cause. My teacher Ammonius wrote a whole book offering many proofs that Aristotle thought God was also an efficient cause of the whole cosmos, a book from which I have here taken over some items sufficient for present purposes. More complete instruction on the subject can be got from there. RRKS

Reading

R. Sorabji, *Matter, Space and Motion*, London & Ithaca, NY 1988, ch. 15.

Carlos Steel, '"Omnis corporis potentia est finita": l'interpretation d'un principe aristotelicien: de Proclus à S. Thomas', in Jan P. Beckmann *et al.*, eds, *Philosophie im Mittelalter*, Hamburg 1987.

8(e) What is Plato's demiurgic creator?

Plotinus identifies the Divine Craftsman or Demiurge, who shapes the universe and makes the World Soul in Plato's *Timaeus*, with the divine Intellect, 2.3 [52] 18 (15); 5.9 [5] 3 (26); 4.4 [28] 10, whereas Porphyry identifies the Demiurge with the World Soul itself. The contrast is not so great, because Plotinus too gives a role to the World Soul in shaping the universe, under the auspices of Intellect. Even the verb *dêmiourgein*, to craft, is used, as Cristina d'Ancona argues, of the World Soul at Plotinus 4.7 [2] 13 (1-13). Presumably, this was all the easier, given that Aristotle had used *dêmiourgein* of inanimate nature (*phusis*), *PA* 1.5, 645a9; *GA* 1.23, 731a23.

Iamblichus and Proclus, however, are shocked at Porphyry's deviation from Plotinus. Iamblichus *ap.* Stobaeum 1.365,7-17, goes further, and accuses Porphyry of sometimes making soul homogeneous with, and no different from, Intellect. ('Soul does not differ at all, at least as regards its universal essence from Intellect'.) The phrase shortly before, 'all such substance' may or may not be introducing the same point, according to whether it means that Soul *and Intellect* are homogeneous with *each other*, or merely that *Soul* is homogeneous with *itself*. See Carlos Steel, *The Changing Self*, Brussels 1978, ch. 1, especially p. 25.

Iamblichus and Proclus went on to take up a much more complicated position. The level of intellect is divided into, first, three triads of intelligible gods, then three triads of intelligible and intellective gods, and below that again a set of seven gods, which starts with a seventh triad of intellective gods called Fathers. The Demiurge is the third intellective Father in this seventh triad.

More complicatedly still, Proclus, following Syrianus, recognises several demiurges. At *in Tim.* 1.310,15-24, the Demiurge of Plato's *Timaeus* is distinguished from a lower demiurgic triad as creating universal things in a universal way (*hola holikôs*). He and his creation are therefore often called 'universal'.

Ammonius may revert to Plotinus' scheme in which the Demiurge is Intellect.

Plotinus:

(1) Plotinus 2.3 [52] 18 (8-16)

If this is correct, the soul of the universe must contemplate the best, always aiming at the intelligible nature and God, and when it is being filled and has been filled as it were brim full, its lowest part or image must be this maker. This, then, is the last maker, but on top of it is the part of the soul which is the first to be filled from Intellect. And on top of all is the Craftsman Intellect (*nous dêmiourgos*) which gives the soul next to it gifts whose traces are in the third soul. RRKS

(2) Plotinus 4.4 [28] 10 (1-2)

But since what shapes the cosmos (*to kosmoun*) is of two kinds, we speak of one as the Craftsman (*dêmiourgos*), and of the other as the soul of the universe. RRKS

(3) Plotinus 4.7 [2] 13 (1-13)

Since, then, the intelligible (*noêton*) is separate, how does this [soul] come into body? Because, while as much [of the intelligible] as is pure Intellect has a purely intellective (*noera*) life, is impassive among the intelligibles and remains there always, since there is no conation (*hormê*) nor desire (*orexis*) in it, still that [part of the intelligible, viz. what becomes soul] which acquires desire, is adjacent to intellect and as it were proceeds further outwards because of the addition of desire and desires to order things in accordance with what it saw in Intellect, as if it were pregnant from the [intelligibles] and were labouring to give birth, and it is eager to create (*poiein*) and work as craftsman (*dêmiourgein*). Through this eagerness, [soul] is intent on sensibles, and with the entire soul of the universe it rides above what it governs from outside it and helps to care for the universe. But because it wants to govern a part, it is cut off and comes to be inside what it is in, but it does not as a whole or entirely come to belong to body, but has some of itself outside body as well. RRKS

Porphyry criticised by Iamblichus and Proclus:

(4) Porphyry and Iamblichus *ap.* Proclum *in Tim.* 1.306,31-307,7; 307,14-19

After Amelius, Porphyry, thinking he is in agreement with Plotinus, calls the Soul above the cosmos 'the Demiurge', and calls the Intellect of this soul towards which it has reverted 'the Living Being', so that the model used by the Demiurge corresponds to this Intellect. It is worth asking Porphyry where Plotinus makes Soul into the Demiurge. And how does this harmo-

nise with Plato, who continually calls the Demiurge 'God' and 'Intellect', but never 'Soul'? ...

Having written a great deal against Porphyry's view and demolished it as <not> Plotinian, after Porphyry the divine Iamblichus hands down his own theology, and calls the entire intelligible world 'Demiurge', as is clear from what has been said, in harmony with Plotinus. RRKS

(5) Porphyry *ap.* Iamblichum *On the Soul ap.* Stobaeum, 1,365,7-14; 17-21

There are then some who represent all such substance as homogeneous (*homoiomerês*) and one and the same, so that everything is in any part of it. They situate even in a particular soul the intelligible world and the gods and daemons and the good and all the kinds more eminent than soul, and represent all things as being in all things alike, though in each according to its particular essence. ... Porphyry is in two minds about this view, sometimes eschewing it strongly, but sometimes following it as handed down from above. According to this view, soul does not differ at all, at least as regards its universal essence, from Intellect and the gods and the greater kinds. RRKS

Iamblichus and Proclus:

(6) Iamblichus *ap.* Proclum *in Tim.* 1.308,19-23

Writing *On the address of Zeus in* [*Plato's*] *Timaeus,* [Iamblichus] allots to the Demiurge the third rank among the Fathers, after the intelligible triads and the three triads of intellective <and intelligible> gods, within the seventh triad [reading: *hebdomêi triadi*, with Thomas Taylor and A.J. Festugière; otherwise, if we read *hebdomadi* with the *mss*, we have 'within the set of seven gods'], the intellective. HT, RRKS

(7) Proclus *in Tim.* 1.311,19-20

He [the Demiurge], then, is no other than the third of the intellective Fathers. RRKS

(8) Proclus *in Tim.* 1.310,15-21 following Syrianus

In the entire demiurgic cosmogony, one thing is the demiurgic cause of universals in a universal way (*holôn holikôs*), another of particulars (*merôn*) in a universal way, another of universals in a particular way (*merikôs*), another of particulars in a particular way. The demiurgic Creation being quadruple, the demiurgic monad bound to itself the universal Providence over universals, and the demiurgic triad depends on [the monad], and oversees the particulars in a universal way. RRKS

Reading

Cristina d'Ancona Costa, 'Porphyry, universal soul and the Arabic Plotinus', *Arabic Sciences and Philosophy* 9, 1999, 47-88.

Werner Deuse, 'Die Demiurg bei Porphyrios und Iamblich', in C. Zintzen, ed., *Die Philosophie des Neuplatonismus*, Darmstadt 1977, 238-78.

John Dillon, 'Plotinus' *Enn.* 3.9.1, and later views on the intelligible world', *Transactions of the American Philological Association* 100, 1969, repr. in John Dillon, *The Golden Chain*, Aldershot 1990.

Jan Opsomer, 'Who in heaven is the Demiurge? Proclus' exegesis of *Tim.* 28C3-5', *Ancient World* 32, 2001, 52-70; errata can be obtained from the author.

Jan Opsomer, 'Proclus on demiurgy and procession: a Neoplatonic reading of the *Timaeus*', in Rosemary Wright, ed., *Essays on Plato's Timaeus*, London 2000, 113-43.

Koenraad Verrycken, 'The metaphysics of Ammonius son of Hermeias', in Richard Sorabji, ed., *Aristotle Transformed*, London and Ithaca, NY 1990, ch. 10.

8(f) Continuous creation

In Plato's *Timaeus*, the Divine Craftsman or Demiurge, and his agents the lesser gods, are responsible for what is presented as the original act of shaping and animating a previously disorderly universe. But they are not made to account for subsequent creation. It took new interpretations and ideas to make creation continuous in this way, e.g. Proclus *in Tim.* 1.294,10-12. Aristotle already knows (*Cael.* 1.10, 279b32-280a1) of an interpretation, according to which Plato spoke of a beginning merely to make things pedagogically vivid, but really intended a beginningless and continuous creation. This interpretation may have been designed to ward off Aristotle's attacks on a beginning and it became the majority, though not the universal, Platonist interpretation. See Richard Sorabji, *Time, Creation and the Continuum*, London and Ithaca, NY 1983, ch. 17. By the first century AD, causality was transferred to the Platonic Ideas themselves, when the Middle Platonists made Platonic Ideas into thoughts in the mind of God, as documented under **Logic and Metaphysics 5(c)**.

Augustine in the early fifth century uses the Stoics' seed-like principles (*spermatikoi logoi*, see Sorabji, *Time, Creation and the Continuum*, 302-3), of which he would have learnt from Plotinus, as the mechanism by which God remains the sole creator even today, *On the Trinity* 3.9.16; *City of God* 22.24. In passages translated in **Logic and Metaphysics 3(m)(r)(s)**, Plotinus thinks of Plato's Forms as dynamic active beings which create the qualities we see as mere traces of their activities, *Enneads* 2.6 [17] 3 (11-26); 2.6 [17] 1 (28-38); 6.2 [43] 2 (3-22); 6.2 [43] 8 (11-49); 6.2 [43] 19 (1-11).

(1) Augustine *On the Trinity* 3.9.16 (= 3.8.1-11 Mountain, *CCL* 50)

For it is one thing to fabricate and govern the creature from the central and highest pivot. It is only God the Creator who does this. It is another thing to set some activity in motion from the outside with the powers and faculties distributed by God, so that what is created may emerge at this time or that, and in this way or that. Certainly, those things have all been created already originally and primordially in a certain weaving together of the elements, but come forth when the opportunity arrives. For the world itself is pregnant with the causes of the beings that are born, just as

mothers are pregnant with their offspring. These beings are not created in the world except from that highest essence in which nothing is born, nor dies, nor begins to be, nor ceases. RRKS

(2) Augustine *City of God* 22.24 Dombart and Kalb, *CCL* 48, p. 848, lines 57-63

For by the very activity by which [God] still works up to the present time he makes the seeds unfold their numbers and roll them out from certain hidden and invisible folds into the visible forms of this order which we see. He himself joins and connects incorporeal and corporeal nature in wonderful ways and makes it animate, the one [nature] put first, the other subjected to it. RRKS

9. Did the Universe Have a Beginning?

The pagan Greek philosophers thought that the physical universe had no beginning, even though some believed its present orderly arrangement, the *kosmos*, had a beginning. Christianity was unusual in holding that matter itself began. The sixth-century AD Christian Philoponus was steeped in pagan Neoplatonist ideas, but turned them against the pagans, most notably in his arguments based on the impossibility of an infinite past.

Aristotle argued for the cosmos being beginningless, e.g. *Physics* 8.1. Plato's *Timaeus* appears to argue, on the contrary, that order was created by the Divine Craftsman or Demiurge in a previously disorderly universe, e.g. 52D. But, as mentioned in **8(f)**, Aristotle knows of an interpretation, perhaps designed to ward off his attacks, according to which Plato was speaking vividly for pedagogical purposes, but really intended a beginningless and continuous creation of order. Most Platonists, though not quite all, followed this interpretation of Plato.

Reading

Richard Sorabji, *Time, Creation and the Continuum*, London and Ithaca, NY 1983, ch. 17.

9(a) Infinity arguments for a beginning of the universe

Aristotle had invented, and much of Greek philosophy had accepted, a concept of infinity which is often used even nowadays. There cannot be a more than finite number of anything, but infinity exists whenever it is true that, however large a finite number of something you have got, there can always be a larger finite number. Infinity is thus an ever expandable finitude, a concept which survives in the idea of approaching a limit. The future might be infinite in this sense, that however large a finite number of years have come to be added to the present year, or to any other starting year, a larger finite number will come to be added. But if the pagans are right that the universe had no beginning, the past will not be like this. The number of years that have elapsed up to the present year, or to any other finishing year, ought to be more than finite, an idea which the Neoplatonists, following Aristotle, had rejected as impossible; so on their own view they should admit the Christian belief in a beginning.

There is worse: if the years up to the present are infinite, how many years will have elapsed by next year – infinity plus one? And how many days – infinity times 365? It was not until the fourteenth century that the Latin West was able to explain a sense in which you can have something larger than infinity. Imagine the years that have already arrived, starting from the *present*, arranged so as to stretch away from your left eye towards a beginningless past, and the same years starting from *next* year arranged similarly stretching away from your right eye. Then one column will be larger than the other in the sense that it contains one extra member *besides*, namely next year, but it will not be larger than the other in that it sticks out *beyond* the far end of the other column, because neither column has a far end. This contrast

between *beyond* and *besides* was unavailable to Aristotle, who denied what is here admitted, that one more than finite collection could be a *part* of another more than finite collection (*Physics* 3.5, 204a20-6, see **10(a)** below). The contrast of beyond and besides is found in fourteenth-century Latin thinkers, Henry of Harclay and William of Alnwick. But Conrad Scott has pointed out to me that Grosseteste, in his treatise on light in the first half of the thirteenth century, already knows, I presume from Arabic sources, that there are different sizes of infinity. Al-Haytham's work on light had been translated into Latin, and his belief that light radiates in all directions from every point would imply a plurality of infinities. But Roshdi Rashed points out to me that before his death in AD 901 Thabit ibn Qurra used one-to-one correspondence to prove that the natural numbers and the subset of even numbers have the same infinity. An ancient Greek thinker who may have understood the situation is Archimedes, *c.* 287-212/211 BC, depending on what he meant by different infinities being 'equal in multitude', in *The Method of Mechanical Theorems*, currently being deciphered in a severely damaged tenth-century parchment palimpsest by Reviel Netz.

Philoponus' infinity arguments were once credited to St Bonaventure in the thirteenth century, but H.A. Davidson has shown how they were transmitted from Philoponus via Islam.

(i) Infinity of past years cannot be actual, traversed, exceeded or counted

(1) Philoponus *contra Aristotelem ap.* Simplicium *in Phys.* 1179,15-26 (fr. 132 Wildberg)

Suppose the spheres do not revolve at equal speeds, but one takes thirty years, another twelve, and each in turn less, so that the sphere of the moon takes a month, and that of the fixed stars a day and a night. Suppose too that the movement of the heavens has no beginning. Then the sphere of Saturn must have revolved an infinity of circuits, that of Jupiter nearly three times as many, while the circuits of the sun will be thirty times those of Saturn, those of the moon three hundred and sixty times as many, and those of the fixed stars more than ten thousand times. Is this not beyond all absurdity, if the infinite cannot be traversed even once, to entertain ten thousand times infinity, or rather infinity times infinity? Hence it is necessary that the revolution of the heavens should have had a beginning of its existence, without having existed previously, namely, when the heavens themselves began to exist. RRKS

(2) Philoponus *contra Proclum* 9,14-11,17

So since, if the cosmos is uncreated (*agenêtos*), past time is actually infinite, the individuals which have come into being in that infinite time must presumably also be actually infinite in number. Hence, if the cosmos is uncreated, the result will be that there exists and has occurred an actually infinite number. But it is in no way possible for the infinite to exist in actuality, neither by existing all at once, nor by coming into being part at a time, as we shall show more completely, God willing, in due course

elsewhere. For after refuting all the puzzles designed to show that the cosmos is everlasting, we then establish for our part that the cosmos cannot be everlasting. And I shall cite Aristotle himself establishing this very point in his own words, I mean that the infinite cannot in any way exist in actuality. I think this is also clear from the facts. Since the infinite cannot exist all together and at once, for the very same reason it cannot emerge into actuality by existing part at a time. For if it were at all possible for the infinite to exist part at a time, and so to emerge in actuality, what further reason would there be to prevent it from existing in actuality all at once? For saying that it is brought to birth in actuality part at a time, through being counted, so to speak, unit by unit, one after another, would appear much more impossible than saying that it exists all together and at once. For if it exists all at once perhaps it will not have to be traversed unit by unit and, so to speak, enumerated. But if it comes into being part at a time, one unit always existing after another, so that eventually an actual infinity of units will have come into being, then even if it does not exist all together at once (since some of its units have ceased when others exist), none the less it will have come to be traversed. And that is impossible: traversing the infinite and, so to speak, counting it off unit by unit, even if what does the counting is everlasting. For by nature the infinite cannot be traversed, or it would not be infinite. Hence if the infinite cannot be traversed, but the succession of the race has proceeded one individual at a time, and come down through an infinity of individuals to those who exist now, then the infinite has come to be traversed, which is impossible. So the number of earlier individuals is not infinite. If it were, the succession of the race would not have come down as far as each of us, since it is impossible to traverse the infinite.

[11,2] Moreover, suppose the cosmos had no beginning, and the number of individuals down, say, to Socrates was infinite and there have been added to it the individuals who have come into existence between Socrates and the present. Then there will be something greater than infinity, which is impossible.

[11,6] Again, the number of men who have come into existence will be infinite, but the number of horses which have come into existence will also be infinite. You will double the infinity again; if you add the number of dogs, you will triple it, and the number will be multiplied as each of the other species is added. This is one of the most impossible things. For it is not possible to be larger than infinity, not to say even many times larger.

[11.14] Thus if these strange consequences must occur, and more besides, as we shall show elsewhere, if the cosmos is uncreated, then it cannot be uncreated or lack a beginning. RRKS

Simplicius' reply: the past years no longer exist, as Aristotle pointed out in *Phys.* 3.6 and 3.8, so there is not more than one year.

(3) Simplicius *in Phys.* 506,3-18

For how could what is not existent nor persists increase or receive some addition? So we should not say that the monadic number is increased, since this has its being only in conception, nor that of men, or of change, or of time, or in general of things that come to be and cease to be. For their numbers have their being in the ceasing to be of the earlier. The earlier ones do not persist, so that those that come next can be added to them and the initial number be increased, except in our imagination which itself does not persist. But this increase could only occur in the case of the addition of cut-off segments of magnitudes, sometimes regarded as magnitudes, sometimes as units, and thus sometimes being increased without limit as a magnitude, sometimes as a number. This means that the actual never achieves limitlessness, whether it be a magnitude or a number, but the capacity to proceed continually without limit is present potentially, because of the potentiality and limitlessness of the matter present in them; and it is because of the matter that process without limit occurs also in the addition of enmattered numbers. JOU

(4) Aristotle *Phys.* 3.6, 206a33-b3

But in extended objects, this [taking of one thing after another] occurs in such a way that what is taken stays behind; whereas in the case of time and of men, what is taken ceases to exist, though in such a way that the series does not fail. RRKS

(5) Aristotle *Phys.* 3.8, 208a20-1

Time and movement are infinite, and so is thinking, in such a way that what is taken does not stay. RRKS

(ii) Problems with infinity bounded in one direction

Startlingly, Aristotle *Cael.* 1.12 treats a time like the past, which is bounded in one direction by the present, as not infinite. Moreover, the whole of time is treated as possessing an infinity that is not expandable after all, but fixed, and having nothing beyond it. Simplicius *in Cael.* 347,15-30, tries to argue that Aristotle is not abandoning his idea of infinity as an expandable finitude, but merely pointing out that any expansion of time does not lie outside the whole of time. Presumably, the past would lack infinity only in the weak sense of lacking unboundedness in one direction. But Simplicius elsewhere may need more than this, when he rejects the infinity of past motion on the ground that it is bounded by the present (*in Phys*).

(6) Aristotle *Cael.* 1.12, 283a9-10

Infinite time than which there is no greater is in a way fixed. But what is infinite in one direction is neither infinite nor fixed. RRKS

(7) Simplicius *in Cael.* 347,20-4

In the case of the time which progresses in the direction of infinity, even if it always does so, there is [always] a time beyond what has been taken; but this too is a part of it, and there is nothing outside this whole, just as there is no time greater than it. And this is infinite time which [progresses] in the direction of infinity and is itself delimited by the fact that it never leaves off and that there is nothing greater than it. RRKS

(8) Simplicius *in Phys.* 1180,6-10

Even if we say that motion is beginningless and endless, yet motion up till now is not infinite. At least we postulate the present as its boundary. So the motion of this particular fire is not preceded by motion that is infinite in actuality. At least motion up to the present is bounded by this present. RRKS

(iii) There cannot be infinite causal chains

Again, Philoponus is turning Aristotle's own repeated statement against him.

(9) Philoponus *contra Aristotelem ap.* Simplicium *in Phys.* 1178,7-35 (fr. 132 Wildberg)

As if he [Philoponus] had refuted those arguments, he dares to offer a proof himself in his own person that motion cannot be ungenerated. For the proof he assumes three premisses. (1) The first is that if something which comes into being necessarily requires something preexistent for its coming into being, as a ship requires timbers, then it will not come into being, if those other things have not come into being first. (2) The second premise is that an infinite number cannot exist in actuality, nor can it be traversed in counting, nor can anything be greater than infinity, nor infinity be increased. (3) The third premise is that a thing cannot come into being, if what is needed for its doing so is an infinity of pre-existing things, one arising out of another. For, says Philoponus, it was on this basis that Aristotle himself showed, in his treatise *On Generation* [*GC* 2.5, 332b30ff.], that the elements of bodies cannot be infinite, not even in the number of individuals, if one arises out of another. For infinity cannot be traversed; so fire, for example, would not have time to come into being if it had to do so after an infinity of other things.

[1178,19] With this agreed in advance, then, says Philoponus, suppose that the particular movement of this fire has a beginning and end, and requires for its own coming into being that another movement should do so first. Suppose, for example, that the body of the fire had by some movement to come into being out of air which was undergoing change. And suppose again that, before the movement of the air which has changed into fire,

there was first some other movement, say, of water, by means of which the water changed into air. And suppose that before that there was another movement, and so on *ad infinitum*, if the cosmos and the transformation of things into each other had no beginning. In that case, there would have to have been an infinity of movements first, in order that this particular fire might come into being. For it would not have come into being, if an infinity of movements had not existed first, because of the first premiss, so he claims. So if it is impossible for an actual infinity of movements to have arisen, because of the second premiss, it will then not have been possible for the movement of a particular fire to take place, both for these reasons and because of the third premiss, which says that a thing will not come into being, if [reading *hou*] an infinity of things have to exist before it does so. Hence, if the movement of a particular fire has taken place, then, by the necessity of contraposition, there will not have occurred before it an infinity of movements. RRKS

Averroes and Maimonides later report and Thomas Aquinas accepts the concession that *accidental* causal chains can be infinite.

Reading

M.A. Davidson, 'John Philoponus as a source of medieval, Islamic and Jewish proofs of creation', *Journal of the American Oriental Society* 89, 1969, 357-91.

Richard Sorabji, *Time, Creation and the Continuum*, London & Ithaca, NY 1983, ch. 14.

9(b) 'Why not sooner?' argument against the universe beginning

The argument that things could not have begun because there is no reason for them to begin at one time rather than at an earlier time may be best known from Leibniz and Kant, but it started in Parmenides and is here used by Simplicius. It is an example of the pattern of argument: 'why this rather than that?'. One of the answers given by Augustine to the 'why not sooner?' objection was that, on the assumption that time requires events, there *was* no sooner time, since before the universe began, there were no events, *Confessions* 11.13; 11.30; *de Genesi contra Manichaeos* 1.2.3; *City of God* 11.5-6. But the 'philosophers' mentioned by Ghazâlî *Destruction of the Philosophers*, incorporated in Averroes *Destruction of the Destruction* 83-4 Bouyges, translated by van den Bergh 48-9, and after them Leibniz, both showed how we can still make sense of the 'why not sooner?' question, by thinking backwards from the present. If it is suggested that the universe began a million years ago, the challenge 'why not sooner?' can be put as the question, 'why not a million *and one* years ago?'. To bring this about, God would only need to have tacked on an extra revolution of the earth around the sun at the beginning of the series. To imagine God doing so is not to imagine extra time without extra events. For, as Leibniz says (the Arabic version is slightly different), the extra year would have involved the extra revolution.

(1) Simplicius *in Phys.* 1175,35-1176,4

If things exist at a later time, not at an earlier, they cannot have come from

nothing, for what comes from something is brought to light in accordance with a chain of preceding and following events. The Trojan war, for example, was capable of happening at that time, not at another, because of the chain of events preceding, accompanying and following it. But if things existed from nothing, why should they come into being at one time rather than another? RRKS

(2) Simplicius *in Phys.* 1177,29-32

With things created out of nothing, there is no reason why they should have passed into being at one time and not another, in the way that what comes into being from something has an immediately obvious reason for coming into being at that time, because, as I said, of the chain of what precedes and follows. RRKS

(3) Simplicius *in Cael.* 138,2-16

But where something first does not exist and later does, if there is no previous aptitude [for existence], why on earth did it come forth then and not at another time? Well, since it has a time preceding the time when it appears in being, is the time of its appearance continuous with the earlier time and arranged after it? If someone says, 'Why has today appeared now?', the answer is ready that it got this position in the whole of time, with some days preceding it and others following. So too what happens at the present time has things preceding it out of which it arises and things following it into which it changes. For the movement of the heavens by which it is immediately accomplished also has a movement preceding it and a movement following. And that is why such things come about and cease not earlier, nor later, but now. So if something was established from not being and perished into not being, no one I think could explain its doing so now and not earlier. By contrast, what is always established in being, since it is not established by way of some transformation, does not call for the question, 'why now and not earlier?'. RRKS

Reading

Steven Makin, *Indifference Arguments*, Oxford 1983.
Richard Sorabji, *Time, Creation and the Continuum*, London & Ithaca, NY 1983, ch. 15.

9(c) Replies to argument against a beginning

(i) God's willing this change would not imply his changing his will

(1) Philoponus *contra Proclum* 568,6-11

But it does not follow either, if what God wills to exist should exist at one

time and not at another, that we should say God at one time wills one thing and at another wills something different. For in God the will for good is one and single, and each being partakes of that will come what may, in the way natural for it. RRKS

(2) Philoponus *contra Proclum* 568,20-569,6

So the will of God for everything to exist is simple in form, as his foresight and knowledge is simple. But his foresight is not multiplied by the multiplicity of things foreseen, nor is his knowledge diversified and extended in reaching the most particular things by the diversity of entities and the division of their being. Rather he knows divided things undividedly and diversified things in a simple way and things in time timelessly. So too the will of God for all things to exist is not extended with the extension of the time of the things that are brought into being. For it does not follow if things come into being and exist at different times, that the will of God for them to exist becomes at different times a will for different things. But as he always knows what is going to be, and what is not yet is present to him in his foreknowledge, so assuredly he always has a will for the being of what is going to be. RRKS

This consideration was already used by Augustine, *Confessions* 11.10; 11.30; 12.15; 12.28; *City of God* 11.4; 12.15 and 18, and before that, in the context of God's answering prayer, by Origen, *On Prayer* 5-6. It is subsequently found in Thomas Aquinas and Berkeley. Philoponus compares Iamblichus' seminal point about knowledge, that definite knowing does not imply that what is known is definite, whose further consequences are noted, e.g., under **3**.

Reading

Richard Sorabji, *Time, Creation and the Continuum*, London & Ithaca, NY 1983, ch. 15.

(ii) Always willing existence does not imply willing something to exist always

(3) Philoponus *contra Proclum* 566,4-10

For if God always had the will that the ordered exist, it does not follow that he willed that it always exist. For if God constitutes all things just by willing them, still he wills them to exist at some time; he wills them to exist when it is good for each to exist, and it is good for each to exist according to its natural capability. AM

(4) Philoponus *contra Proclum* 567,23-568,2

It was not in the nature of Socrates to exist before Sophroniscus came to be; but even before Sophroniscus came to be, God was willing that Socrates come to be: not come to be without qualification or come to be always, but rather when he was capable of coming to be. So this is also the way that

God was willing that the ordered exist even before it came to be: when it, as a thing that is brought into being, was capable of existing. AM

9(d) Argument against a beginning: a sufficient cause cannot delay its effect

(1) Themistius *in Metaph.* 12.6, pages 12-13 Badawi, Arabic = *CAG* 5.5 Hebrew with Latin trans., Landauer, trans. from Arabic (= Latin p. 14, 22-7)

And how could we imagine its mover – being eternal – without [motion] eternally proceeding from it. For there is nothing to stop it [motion] from proceeding from it. Nor does anything come into being in whatever condition and cause it to be. For all that comes into being comes from it. There is nothing but it alone which can stop it or awaken its desire. GB

Ghazâlî was to reply that a Muslim husband is a sufficient cause of delayed divorce, if he says, 'I divorce you with effect from tomorrow.'

Reading
Richard Sorabji, *Time, Creation and the Continuum,* London & Ithaca, NY, ch. 15.

9(e) Argument against a beginning: new motion requires prior trigger

This is Aristotle's argument at *Physics* 8.1, 251a8-b10. Changes are rung on it in the immediately following words of Themistius.

(1) Themistius *in Metaph.* 12.6, page 13 Badawi, Arabic = *CAG* 5.5 Hebrew, with Latin trans. Landauer, trans. from Arabic with missing sections in italics supplied from Hebrew (= Latin pp. 14,27-15,10)

8. We cannot say: [Initially] it did not have the power to make that [that which comes into being] proceed from it, but *subsequently* it did have that power. For this would make it necessary that a change [should occur] *in it.* It would also make it necessary that there should be something else besides it that would cause this change. And if we say that something stopped it, *there is not only the absurdity that one has to affirm the existence of something else beside it, but also the absurdity that* the cause which stops it is necessarily stronger than it.

9. *And how is it possible for that cause to stop it for an infinite period, and then to allow it eventually? This can only happen when it is becoming different and when it changes. For it is impossible that that which stops it remains in the same condition and that the mover at one time refrains from movement and at another time moves.* And movement only occurs through movement. Accordingly, *for someone who believes in this* there must be

movement before movement, for change, alteration and rest are [different] kinds of movement *and belong to it.*

10. It is inevitable that that which moves is a body. If we say that that body has not come into being but moves from [a situation of] rest, we must relate the cause of its *movement and* change from rest to movement. And if we say that that body has come into being, its coming into being precedes its movement.[1] *And this is the same as movement preceding movement. But it is impossible to suppose that movement should occur from rest.*

11. *If we suppose that a body can come into being from that which does not exist at all, the two things are united and the beginning of the coming into being of a body is the beginning of the occurrence of the movement. And since this is impossible and nothing comes into being from that which does not exist at all, it is impossible that movement should originate from rest.*

12. Now that it is evident *from the matter of movement and from the matter of time in relation to movement that movement is eternal, [to conclude to] what follows from this will be easy for us.* ... GB

[1] Our translation follows the Arabic text as vowelised by Badawi: 'taqaddama ḥudûthu l-jism ḥudûtha l-ḥaraka'. Both H and L read: 'taqaddama ḥudûtha l-jism ḥudûthu l-ḥaraka' (its movement occurs before its coming into being).

9(f) Argument for a beginning: nature makes forms begin to exist

Parts of Philoponus' argument were wrongly ascribed to Alexander by an Arabic source, Dietrich D 16. For an expression of surprise, see Sorabji, *Time, Creation and the Continuum*, 248. But the ascription is now corrected by Hasnawi.

(1) Philoponus *contra Proclum* 341,13-23

So if, as I said, God must be incomparably superior to nature, and nature creates by taking from what [already] exists the substrate and matter, and fashioning only the forms into existence, then if God too creates anything by bringing it into being from nothing, he must inevitably create not only the forms of what is being fashioned, but must also create the substrate itself, which did not exist before. Otherwise he will not be superior to nature. There is, then, no necessity for the whole universe, if it is brought into being by God, to come into being from something previously existent, in the way that each of the particulars comes into being from something. RRKS

Reading

A. Hasnawi, 'Alexandre d'Aphrodise vs. Jean Philopon: notes sur quelques traités d'Alexandre "perdus" en grec, conservés en arabe', *Arabic Sciences & Philosophy* 4, 1994, 53-109.

Richard Sorabji, *Time, Creation and the Continuum*, London & Ithaca, NY 1983, 248-9.

9(g) Reply to argument against a beginning: creation of matter out of unlike, not out of matter

(1) Philoponus *contra Proclum* 448,16-21

If in the second place they are going to say it is necessary that everything that comes into being should need a substrate, i.e. matter, to receive its being, so that from this it appears necessary that if matter comes into being, it too needs some further matter, I do not see how they establish the necessity of the argument. RRKS

(2) Philoponus *contra Proclum* 449,13-16; translated also under **6(f)**

Quite the reverse, everything that comes into being does so from something unlike itself: bronze from non-bronze, water from non-water, human from non-human, I mean in respect of the material cause. RRKS

(3) Philoponus *contra Proclum* 450,8-10

Nor then, if prime matter, i.e. the first substrate, should come into being, would it need some further matter or substrate, in order to come into being. RRKS

9(h) Can natural dispositions to begin and end be overridden by God?

Plato *Tim.* 41A-B concedes the universe had a natural disposition to end, but claims God overrides this. Could God override it? No, replies Alexander, God cannot do the impossible. Cf. above under **3**.

(1) Alexander(?) *Quaest.* 1.18, 31,24-32,19

[So,] if the universe, being generated, possessed in itself the possibility both of perishing and of not perishing, it would be possible for it to become impossible for it to perish, because it was prevented from perishing by something. But if perishing is of necessity and in the very nature of everything that has come to be, it will apply of necessity, to everything that comes to be, that it must perish. But it is impossible for that, to which perishing [applies] of necessity, *not* to perish, on account of its nature's being unable to attain to eternity. So the universe too, being perishable of necessity, *if* indeed it *is* generated, according to its own nature does not admit of eternity. But [if] something in this way does not admit of eternity, it is *impossible* according to its own nature for it to admit of eternity.

[32,3] And what is impossible in this way, being impossible for all, will be [impossible] for the gods too. For neither is it possible for that, which applies to something of necessity, ever to be prevented from applying to

those things to which it applied in that way; nor is it possible for that, for which it is impossible to apply [to something], to come to apply [to it]. For the only things for which it is impossible to be prevented from applying to certain things are those for which they possess a natural readiness both for possessing them *and* for not possessing them, and for which, apart from being prevented, it would be possible not to come to be in [the things in question]; but it is not possible for the things which accompany certain things *of necessity* to be prevented from coming to be. For in this case the same thing will at the same time come to be and not come to be – coming to be because it was necessary for it to come to be, not coming to be because it had been prevented; and this is impossible. And it is impossible for the perishable to be prevented from perishing, since it is necessary for the perishable to perish and impossible [for it] not to perish. For [in this case], it will at the same time perish and not perish.

[32,14] And that the things that are impossible in their own nature are like this for the gods too, Plato [*Theaetetus* 176A] himself too bears witness through what he says: 'But it is not possible for evils to be done away with, Theodorus; for it is necessary that there should always be something opposite to the good, and it is not [possible] for [evils] to have their place among the gods, but of necessity they roam around mortal nature and this [perceptible] region.' RWS

According to Philoponus, God could not override the correlative natural disposition to begin, although we may well ask why God should not create as beginningless something which, being a compound, has a natural disposition to begin.

(2) Arabic summary of a lost work of Philoponus, translated by Pines, 324-5

(iii) The disagreement between us and him does not [concern] the [portion] of the Creator, may he be blessed and exalted, which is imparted to the world. The disagreement solely [concerns] your saying that the world is by nature eternal *a parte ante*. For if, as you say, it is eternal *a parte ante*, it does not need a force ensuring the preservation of its essence to be imparted to it. For it is a characteristic of a thing which is eternal *a parte ante* by nature that the force which ensures the preservation of its essence should be a force natural to it and not drawn by it from something else. <If however this force is drawn by it from something else> and received by it from a thing other than its essence [the thing in question] is not eternal *a parte ante* by nature, for it is not then ... <lacuna> It is eternal *a parte ante* only because of a force [belonging] to some other [thing].

(iv) Its eternity *a parte ante* would have been abolished if there had not been this thing which gives it permanent [being] and ensures the preservation of its essence preventing the latter from perishing. Since the world is not by nature eternal *a parte ante* as is asserted by the Eternalists, it must be by nature created in time, as is asserted by us. And it is impossible

for what is by nature created in time to be eternal *a parte ante*. In this there is a refutation of the doctrine concerning the eternity *a parte ante* of the world adopted by the Eternalists. SP

Simplicius replies that the world is fitted by nature to receive eternity from God:

(3) Simplicius *in Cael.* 361,10-15

Just as [the world] is created and finite in itself, so it is at the same time fitted (*epitêdeios*) for eternity and perpetual motion. So it is not true without qualification even to say that it is perishable by its own nature. For its nature in its entirety is conceived of together with its fitness (*epitêdeiotes*) in relation to the creator (*dêmiourgos*), through whom the world itself shares in eternal benefits. RRKS

Philoponus quotes, or paraphrases, Galen as supporting his own view that if a natural disposition to end is overridden by God, as in Plato's *Timaeus*, the resulting endlessness does not imply beginninglessness.

(4) Galen *ap.* Philoponum *contra Proclum* 600,14-601,19 Rabe

[*Galen*]: 'The mind readily accepts that everything ungenerated is thereby also indestructible, and if any other primary proposition is among [truths] evident to understanding, so is this kind of proposition, even if there are others. But some spelling out is needed if we are to accept readily that everything indestructible is necessarily also ungenerated. What spelling out? It consists in distinguishing in what way the particular thing is agreed to be indestructible. Does it not even in principle admit (*logon epidekhesthai*) destruction at all, as what is completely simple can also not be affected? Or is it as having acquired an adventitious immortality, which is the sort of thing Plato is thought to say in the *Timaeus* [41B] even about the gods, when he makes the first god talk with them. This is [God's] speech: "Since you have come into being, you are not altogether immortal or indissoluble. You will not be dissolved, nor will you have any part in death, since you have my will (*boulêsis*), a still greater and stronger bond than those with which you were bound when you came into being." [Plato] expounds this same thing also in the *Statesman* [269D; 273E] in connexion with the entire heaven, since something is conceived which will not be destroyed, even if it has come into being. Take, say, the city of the Spartans: It is possible for it never to be destroyed even though all the individual houses are of a nature to be destroyed. But the whole can avoid destruction, because reconstruction can take place bit by bit. One can conceive not only of a city being in this way indestructible, but even of a single house, if its damaged parts get reconstructed every time. So, by analogy, while if it is ungenerated, it is also indestructible, come what may, still, if it is indestructible, it is not of necessity ungenerated.'

[*Philoponus*]: So this man [Galen] also said clearly that being ungenerated does not follow from any old indestructibility, but from being not even in principle destructible, and has agreed that Plato gives the heaven indestructibility in [the former] way. RRKS

Many of these arguments assume that in nature what begins must end, bar divine interference. But this principle of the symmetry of beginning and ending is challenged by Augustine by reference to the human soul, whose blessedness begins without ending, in the continuation of an anti-Platonist passage quoted under **6(c)**.

(5) Augustine *City of God* 10.31 Dombart and Kalb, *CCL* 47, p. 309,18-29

If, then, the soul has always existed, must we say that its misery has always existed too? And if anything that has not existed from eternity began to exist in the soul from some time, why should it not have been possible that the soul itself existed from some time, without having existed previously? Further, the soul's happiness too, which is firmer after being tried by evils and will last without end, as he [Porphyry] admits, undoubtedly began from some time, and yet will exist always, although before that time it did not exist. Thus is dissolved the whole argument which maintains that nothing can escape an end in time unless it escaped a beginning in time. For we have found the soul's happiness, which will not have an end in time, even though it had a beginning in time. RRKS

Reading

Lindsay Judson, 'God or Nature? Philoponus on generability and perishability', in Richard Sorabji, ed., *Philoponus and the Rejection of Aristotelian Science*, London & Ithaca, NY 1987, ch. 10.

Shlomo Pines, 'An Arabic summary of a lost work of John Philoponus', *Israel Oriental Studies* 2, 1972, 320-52.

R.W. Sharples, 'Alexander of Aphrodisias[?] problems about possibility 2', *BICS* 30, 1983, 99-103.

R.W. Sharples, 'The unmoved mover and the motion of the heavens in Alexander of Aphrodisias', *Apeiron* 17, 1983, 62-6.

Richard Sorabji, *Matter, Space and Motion*, London & Ithaca, NY 1988, 254-9.

Koenraad Verrycken, 'Philoponus' cosmogony', in *Documenti e studi sulla tradizione filosofica medievale* 8, 1997, 269-318.

10. Infinity and Infinite Divisibility

10(a) Aristotle's conception of infinity

(i) Aristotle's concept of infinity as ever-expandable finitude

Aristotle's concept of infinity is explained above under **9(a)**, but the passages of Aristotle remain to be given. According to Aristotle in *Phys.* 3, infinity is not a more than finite number, but a finitude expandable without limit. Philoponus turned this conception against Aristotle's belief in a beginningless past, since this would, Philoponus complains, involve a more than finite number of past years. See **9(a)(ii)** for Aristotle and Simplicius excluding an infinite past by taking a view of infinity as not expandable after all, but as maximal and fixed, with Simplicius' attempt at reconciliation.

(1) Aristotle *Phys.* 3.6, 206a27-9

For in general infinity exists through one thing always being taken after another, what is taken being always finite, but ever other and other. RRKS

(ii) Infinite sub-parts

A major objection to a more than finite number of anything was that a part of it could equally be more than finite. For progress in dealing with this problem, possibly in Archimedes and certainly in medieval thought, see under **9(a)**.

(2) Aristotle *Phys.* 3.5, 204a20-30

But it is evident also that the infinite cannot exist in actuality and as a substance and principle. For any part of it that was being taken, if it is divisible, would then be infinite (since if the infinite is a substance and not a predicate, the infinite and the essence of infinite is the same). Hence it is either indivisible, or divisible into infinites. But it is impossible for the same thing to be many infinites, yet if it is a substance and principle, infinite will be part of infinite as air is part of air. So it will be without parts and indivisible. But it is impossible for what is actually infinite to be indivisible, because it must be some size. So infinitude belongs to things as an accident. RRKS

(iii) Infinity distinguished from whole

The conception of infinity as an ever expandable finitude shows that the infinite is not the same as the whole or the complete, despite the anomalous passage in *Cael.* 1.12, treated in **9(a)(ii)**. Aristotle's view draws on the account of whole and all in

Plato *Theaetetus* 205A. For these leave nothing of themselves outside, whereas the infinite, being for ever expandable, always leaves something of itself outside. Below, under **14(b)**, Alexander exploits this, to show the physical universe cannot be infinite in size, as Aristotle agreed, even though he had allowed it to be beginningless in time, thus appearing to create an asymmetry between time and space.

(3) Aristotle *Phys.* 3.6, 207a7-10

So infinite is that of which it is always possible to take something from outside, when taking it quantitatively, whereas complete and whole is that of which nothing is left outside. For we define whole, for example a whole man or ox, as that of which nothing is missing. RRKS

(iv) Divisibility anywhere and denseness in Aristotle

Discussing infinite divisibility, Aristotle allows that there is as large a finite number of dividing points in a line as anyone cares to install mentally or physically.

Aristotle also allows that the line can be divided anywhere, but not everywhere (*GC* 1.2, 317a8-9). He also has the idea of denseness, that between any two dividing points there is always room for more.

(4) Aristotle *Phys.* 6.1, 231b6-10

Yet neither will point be next to point, or instant to instant, in such a way that length or time will be composed of these. For things are next to each other when there is nothing of the same kind between them, whereas between points there is always a line and between instants a time. RRKS

10(b) Infinite divisibility: are there any indivisibles?

Aristotle attacked the atomists, denying that there could be particles which it was conceptually impossible to divide at least mentally. In *Physics* 6, he argued that there is no way such particles could be arranged to make up matter, and that space, time and motion would all become discontinuous. In *GC* 1.2, he is not impressed by the threat that infinite divisibility threatens disintegration through things being divided everywhere. But are there no indivisibles?

(i) Damascius' divisible leaps

Damascius' divisible leaps in time and motion are designed to avoid not discontinuities, but discontinuities of atomic length. See under **11(e)**.

(ii) Minimal forms

Although for Aristotle matter is infinitely divisible, particular kinds of stuff, e.g. flesh, may not survive the division, because their defining form will be lost.

This is part of Aristotle's objection in *Physics* 1.4 to Anaxagoras' idea, which he understands as meaning that within any matter, however small, that is predomi-

nantly flesh, there will be particles that are predominantly, let us say, honey, and within those there will be particles that are predominantly flesh, etc. This is already objectionable as postulating more than one infinity. But in addition, although matter can always be mentally divided, it will not still be flesh. Flesh has a minimum size (187b13-21). The commentators took this up and it gave encouragement, despite Aristotle, to corpuscular theories. With Philoponus' reference to presiding nature imposing (*epitithenai*) forms, cf. his *in GC* 169,7-11, translated below under **20**.

(1) Simplicius *in Phys.* 167,2-17

For the wholes mixed together and compounded from the homogeneous parts, such as any animal or plant, cannot be any size whatever; for it is not possible for a human being or a fig-tree to be the size of a millet-seed or a mountain, but rather there is a greatest and a least magnitude determined for them. Therefore the magnitude of each of their parts, into which they can be divided, is also determined. And it is not possible to pick out flesh of any size whatever, since flesh is a part of an animal. For that animal of which it is a part would also be any size whatever. From such homogeneous parts the animals are compounded, according to Anaxagoras, and into them they can be divided. For according to him nothing is higher than these. Therefore the magnitude of these is also determined: Having advanced up to some point it will remain in its proper form. And if someone says that every magnitude is divisible *ad infinitum*, and that because of this there is a smaller magnitude than anything one picks out, let him know that the homogeneous parts are not simply magnitudes, but already magnitudes *of particular sorts*: flesh and bone and lead and gold and things of that kind, which when divided *ad infinitum* cannot retain their form. For while as magnitudes they too can be divided *ad infinitum*, as flesh and bone they no longer can. RB, BP

(2) Philoponus *in Phys.* 98,13-99,3

In response to these points, the mathematically trained raise a difficulty for us. If it is granted, say they, that the given straight line is divided in two, since every magnitude is divisible *ad infinitum*, evidently we might also divide the flesh, which you say is minimal, into two. Well then, are the divided bits flesh or not? If they are of flesh, then it is possible to get flesh smaller than the given one, and that was not the minimum. On the other hand if the divided bits are not of flesh, how do they make flesh when they are put back together again? And if flesh is uniform, evidently its parts would be flesh. So it is possible to take a smaller piece of flesh than any that you have taken, since all flesh is also uniform.

[98,21] In response to these points we say that it is possible to take flesh either as a form or as a magnitude. As a magnitude, flesh is divisible *ad infinitum* (so that it is not possible to get a minimal magnitude) whereas as a form it is no longer possible to divide it *ad infinitum*, but it will

invariably stop at some minimal flesh; if we divide this, immediately we destroy the form of flesh simultaneously with the division. For just as it is possible to take the human being either as human being or as magnitude, and as a magnitude it is divisible *ad infinitum* and always into homogeneous magnitudes, nevertheless if I divide it *qua* human into head and feet, immediately the form of human being is destroyed simultaneously with the division, and exists neither in the whole (for the whole does not exist either) nor in one of the parts (for the human being is uncuttable) – so also I say that even if you were to divide the minimal flesh, you would immediately destroy the form with the cut; for the minimal flesh is uncuttable, and the portions cut off are magnitudes but not flesh. Even if you put the parts of the person together a thousand times, you still would not make a human being, because it requires not just assembling the pieces, but also the presiding nature that imposes the forms (*tês epistatousês phuseôs kai epitheisês ta eidê*). The same is true, I claim, for the uniform stuffs, that even if you put together the portions of cut flesh a thousand times, you still will not make flesh, without the nature indwelling. CO

Reading

Henk Kubbinga, 'Le concept d'*elakhiston* chez Aristote et ses principaux commentateurs grecs', in J.M.M.H. Thisjssen, H.A.G. Braakhuis, eds, *The commentary tradition on* De Generatione et Corruptione, Turnhout 1999.

Andrew G. van Melsen, *From Atomos to Atom*, Duquesne University 1952, Harper Torchbooks, 1960.

(iii) Minimal triangles in Plato's *Timaeus*

Plato's *Timaeus* seems to postulate a finite number of sizes for the triangles that make up fire and other elements (57C-D), and thus a minimum size. But Aristotle's objections focus not on this, but on how two-dimensional triangles could compose solid bodies. Proclus answered that the triangles are three-dimensional.

(3) Simplicius *in Cael.* 648,19-23

To this Proclus says that physical planes are not without depth. For if a body scatters the whiteness that impinges upon it, the planes that contain it will do so all the more. But if they have depth, we can no longer say that bodies are generated out of things that are bodiless, but only that a more composite body is generated out of a simpler one. RMcK

10(c) Rejection of infinite past and infinite causal chains

See above, **9**.

10(d) Infinite power argument for God as creator

See above, **8**.

10(e) Infinite and extracosmic space

See below, **14**.

10(f) Infinite speed in absence of resistance in a vacuum

See below, **22**.

10(g) Infinity arguments for reincarnation and eternal recurrence

(i) Infinite recycling of finitely many forms

If there is a finite number of forms, including forms of individuals (for which see **Logic and Metaphysics 18(b)**), the universe can only continue by repeating itself. But on the other hand, we need not fear infinity.

(1) Plotinus 5.7 [18] 1 (23-4)

The whole cycle contains all the forming principles (*logoi*), so the same beings recur because of the same forming principles. BF

(2) Plotinus 5.7 [18] 3 (13-23)

If the production is random in quantity, then we need another explanation. But if it has been measured out how many things there may be, then the quantity will be determined by the unrolling and unfolding of all the forming principles (*logoi*); so when everything has come to a halt there will be a fresh start. For it has been established from the outset in that which contains the forming principles just how big the universe must be and just how many things will be gone through in the course of its life. Shall we assume in the case of other animals which produce a large litter from one birth that there is an equal number of rational principles (*logoi*)? Infinity is not to be feared in seeds and rational principles, since soul contains them all. Indeed in intellect too, as in soul, there is again the infinity of seeds and rational principles, which in intellect are ready to hand [for soul]. BF, RRKS

(ii) Infinite recycling of finitely many souls

If souls are immortal and there has already been an infinite number of births, we are threatened by a more than finite number of souls, unless souls are recycled through reincarnation.

(3) Olympiodorus *in Phaedo* 10 §1, 1-5

Now there is this ancient doctrine which I remember [*Phaedo* 70C5-72E2]. The doctrine of metempsychosis, or reincarnation, is inevitable if we start from these two premises, the eternity of the world and the immortality of

the soul: If both are to be maintained, there must necessarily be metempsychosis, or else the infinite will exist actually. LGW

(4) Sallustius *On the Gods* 20

1. If [in the case of transmigration of souls], souls transmigrate into rational creatures, they become the very souls of the bodies they enter, and if they transmigrate into irrational creatures then they follow their bodies from without, just as our guardian spirits (*daimones*) follow us. For in no way would a rational soul become the soul of an irrational creature.

2. It is possible to see evidence of transmigration of souls from the congenital defects passed from parents to their children – for indeed why are some born blind and others weak and yet others with a soul afflicted by some illness? And as by nature souls are suited to have their activity in a body, they should not remain eternally inactive once they have departed from [their original] body.

3. For if souls are not borne back into [new] bodies, necessarily they would be infinite in number or God would be forever making new ones. But nothing is infinite in the universe – for nothing infinite could come about in a finite universe – nor is it possible for additional souls to be created – for everything in which something new is born is also necessarily imperfect. But it is in the nature of the universe, arising out of what is perfect, that it is perfect. MR

Reading

Richard Sorabji, *Time, Creation and the Continuum*, London & Ithaca, NY 1983, 182-90.

Richard Sorabji, *Matter, Space and Motion*, London & Ithaca, NY, ch. 10, especially 180-1.

10(h) The instant of change

Aristotle discusses the instant of change, for example, from rest to motion. At that instant, is a thing resting or moving? Neither, because Aristotle allows nothing to *be* moving or resting at a sizeless instant, *Phys.* 6.3; 6.6; 6.8. But we can ask if there is a first instant of *having* left the starting point (cf. Themistius *in Phys.* 196,9-13). Aristotle allows an asymmetry, which is questioned by his successor, Theophrastus, as we are told by Themistius [who has a good discussion of his own] *in Phys.* 191,22-198,2, and Simplicius *in Phys.* 982,1-987,8. The Theophrastus fragments are translated at FHS&G 155-6. Evidently Alexander applied the problem to the question of when someone dies, ap Simplicium 985,25-984,2, as had the Middle Platonist Taurus before him, *ap.* Aulum Gellium *Attic Nights* 7.13.

Aristotle's asymmetry allows a first instant of having completed a change, but not a first instant of having started one, *Phys.* 6.5 and 8.8, 263b15-264a6. Themistius tries out the possibility that Aristotle means only to deny a first *length* of time, but then why not deny a last length, 195,13-28? In other words, the asymmetry seems arbitrary, whether applied to a sizeless instant or to a length of time, if it is taken as a general asymmetry between beginning and ending. But Aristotle's examples may be justified if we reflect that in a continuum there is no first position

away from the starting point, but can be a point of termination. So in a continuous movement there can be a first instant of having reached the terminus, but not a first instant of having left the starting point. The observation ascribed to Theophrastus that this will not apply to discontinuous movement can simply be accepted.

Reading

Richard Sorabji, *Time, Creation and the Continuum*, London & Ithaca, NY 1983, ch. 26, 'Stopping and starting'.
Niko Strobach, *The Moment of Change*, Dordrecht 1998.

11. Time

11(a) Aristotle's definition of time

Aristotle defined time, in *Physics* 4.1, 219b1-8, as that aspect of change which can be counted in respect of before and after. One might, for example, count stages in the rotation of the celestial clock, as the stars wheel round. But that might be merely to count positions, so it is important to think of the stages as before and after. Aristotle treats 'before' and 'after' as spatial terms, 219a14-19, but to think of positions as before and after is to imagine a movement from one to the other, such that one position is reached temporally before the other. So Aristotle's definition of time faced the charge that it was circular, depending on the notion of temporal beforeness. Galen raised a similar objection, and preferred the view that time is self-revealing, but Themistius replied, saying *inter alia* that the circle is harmless. Simplicius tries to explain 'before' and 'after' by reference to the notion of extension (*paratasis*), which P. Hoffmann has reminded us is connected in Stoic grammar with the idea of being in the course of doing something. Simplicius does not say how this temporal notion avoids a vicious circle in the definition. The term is also used by Philoponus, see under **12(a)**, and by Simplicius, see under **11(e)** and **(g)**, for different purposes. A major survey of theories of time is Simplicius' Corollary on Time, *in Phys.* 773,8-800,25, and treatment of the category of When, *in Cat.* 340,15-357,6.

(1) Simplicius *in Phys.* 718,13-719,18

The great polymath Galen objected to some of the things said at this point, saying that the definition is circular, so let us consider this objection also. Having enumerated many things that are signified by 'before' and 'after', he says that the rest do not fit with the definition, but only the before and after in time. Themistius proposes to eliminate this objection by two arguments, saying 'One must know that the before and after in change are not respectively before and after on account of time but rather themselves create the before and after in time. They come about from the before and after in magnitude and in position, through which they also possess continuity. That is why Aristotle explicitly says, "The before and after is first in place, then in position, then in magnitude, and necessarily also in change".' In reply to that Galen would say that the before and after in change following on that in the magnitude over which the change takes place is chiefly in position; for the before and after in magnitude was of that kind. As has been said [715,36ff.], the before in time is different, accompanying the before and after in change, but not having its before and after through position, but through the extension of its existence (*kata tên tou einai paratasin*); and this is something other than the before and after in position derived by motion from magnitude.

Introducing the second reply he [Themistius] says: 'But let it be conceded that before and after signify nothing beyond the temporal, as he [Galen] thinks. What absurdity arises from that? For we ourselves say that time is nothing other than the before and after in change. But there is every need for definitions to signify the same as the names. So he fails to notice that he is censuring that in the account on account of which he should most accept it.' In reply to this Galen would say that if there were but one before and after in change by temporal succession it would be said that time was this before and after in change, and the definition would not be circular. But if there is one, that in position, which is not temporal, another that is temporal, one must say that time is that before and after in change that is in time. But perhaps if one were to take the before and after to be that in the extension of existence, and not that in position, time is signified and not self-signifying. Also its name will not be simply the same thing as the before and after, but as that sort of before and after which is time. JOU, JE

Reading

Philippe Hoffmann, 'Paratasis', *Revue des Études Grecques* 96, 1983, 1-26.
R.W. Sharples, 'Alexander on time', *Phronesis* 27, 1982, 58-81, translation from Latin, corrected by Fritz Zimmermann on the basis of the Arabic.
Richard Sorabji, *Time, Creation and the Continuum*, London & Ithaca, NY 1983, ch. 7.

11(b) Circular time

When there is talk of circular time in Greek thought, it is usually not time itself, but events, which are described as coming round in a circle, like the seasons. There is, however, in the pseudo-Aristotelian *Problems* a discussion of what it would be like if *per impossibile* time were circular. The Trojan war would be in both past and future and anyone who lasted the cycle would, in Alcmaeon's terms, join their beginning to their end and so never die. But the author rejects the idea.

Proclus considers two cases, when he explains the reference in Plato's *Parmenides* 141A-B to becoming younger. When I reach the age of ten, my nine-year-old self becomes younger than my ten-year-old self. But for Plato in *Timaeus* 39D the motions of the planets are time, and eventually, the planets will get back to their original alignments (*sunapokatastasis*), Proclus *in Tim.* 3.84,1, so that time, at least measured time, will start again. Thus they and their souls are, in a fuller sense, getting younger by approaching the beginning of time.

(1) 'Aristotle' *Problems* 17.3, 916a18-39 Ruelle, Teubner

How should we take 'earlier' and 'later'? In the sense that the people in the time of Troy are earlier than us, and the people before them are earlier than them, and as you go higher, the people are always earlier? Alternatively, if there is a beginning, middle and end of the universe, and a man too, when he grows old and comes to his limit, reverts again to his beginning, and things nearer the beginning are earlier, what prevents us being closer to the beginning part? If we are, we will also be earlier. Just as in motion there

is a circle for the heavens and for every star, what prevents the formation and destruction of perishable things being such that the same things [reading: *t'auta*] are always being formed and destroyed? They also say that human affairs form a circle like that.

Now it is simple-minded to think that those being born are always numerically the same people, but we could more readily accept that they are the same in kind. Thus [i.e. on the mistaken view] we ourselves would be earlier, and someone could posit that the order of the series was such as to turn back again to the beginning and to make things continuous and to remain for ever the same way. (In fact Alcmaeon says that people die simply because they are not able to join beginning to end – a clever remark, if you take him to be speaking impressionistically and do not want to make the saying precise).

Now if there is a circle, and a circle has neither beginning nor end, people could not be earlier by being closer to a beginning, neither we earlier than they, nor they than us. RRKS

(2) Proclus *in Parm.* col. 1226,26-1228,26 Cousin

We must therefore turn once again to our Master, and bring to bear upon the problem his discussion, which throws light upon the whole preceding argument. That which partakes in time is of two sorts; the one which, as it were, proceeds in a straight line, beginning from one point and ending in another; the other which travels round in a circle, and pursues its motion from the same point to the same point, so as to have a beginning and an end which are the same and a motion which is unceasing, since each point of its progress is both beginning and end, and is no less a beginning than an end. That, then, which enjoys cyclical activity partakes in time by circuits, and since the same point is for it both an end and a beginning of motion; in so far as it departs from a beginning, it becomes older, [1227] whereas in so far as it arrives at an end, it becomes younger; for as it comes to be nearer to its end, it comes to be nearer to its own beginning; and that which comes to be nearer to its own beginning becomes younger; so then, that which arrives cyclically at its end becomes younger, while at the same time and by the same process also becoming older; for that which draws near to its own end proceeds towards being older; so for that which has a beginning different from its end, becoming younger is different from becoming older; but for that of which its beginning is the same as its end, its youngness is no younger than it is older, but as Plato says, 'It becomes simultaneously younger than itself and older.' For that which is moved in a straight line does not have this characteristic, because end and beginning are different in its case, whereas that which moves in a circle has the quality of being younger than itself by reason of the fact that its motion comes about in relation to the same point as both beginning and as end. So then, everything that partakes in time, if it becomes older than itself, also

becomes younger than itself; and what is of this sort is that which moves in a circle.

[1227,22] For this reason the ancients were understandably disturbed lest this argument be in some way sophistical, since they were looking to things that moved in a straight line, whereas they should have made the distinction and considered what things have the characteristic of having their beginning and end the same, and what have them as different, and they should have considered that the subject of discussion now is divine souls, which partake in time in the respect that they have a periodic time of their proper motion, as indeed do the vehicles which are dependent upon them. This, then, is the argument of our Master. How it comes about that everything that becomes older than itself also at the same time becomes younger than itself will be explained by means of two mean terms by the Second Hypothesis [Plato *Parm.* 153Bff.], which discovers the necessity of the separable coexistence of these in the case of all things that partake in time, and not only in the case of those which move in a circle. For the present, however, let what we have said stand as sufficient, since it relates properly to the present subject matter and to the circuits of divine souls.

[1227,40] But if we are even here briefly to relate the argument, which is of universal application, to all those things [1228] which come to be other than themselves, let us pause for a moment to say that everything in truth which becomes older than itself, while it becomes older, becomes younger also in so far as it becomes older; for example, that which comes to be ten years old comes to be older than what is nine years old; but while it is becoming this, the nine-year-old became older, while the eight-year-old became younger than that which was then coming into existence; for either of the two in the process of generation becomes constantly different from the other and never remains the same. And if we take coming to be in this sense, we shall find that everything truly comes to be older than itself, by reason of always being taken as being in some other state, and, even as it becomes older, so, changing our perspective, it becomes younger also, even as it transfers itself from one aspect to another, becoming older than what it formerly was.

'If one thing is already different from another, there is no question of its becoming different: Either they both already are now, or they both have been, or they both will be, different. But if one is in the process of becoming different, you cannot say that the other has been, or will be, or as yet is, different; it can only be in process of becoming different.' 'Necessarily' [141B-C]. GM, JD

(3) Proclus *in Tim.* 3.57,28-58,4

After this monad there is a triad, of which the highest member is the measure of the first circuit, and the middle member [is the measure] of the whole of the Other (for there is a single life, a single revolution, and a single restoration-time (*apokatastatikos khronos*) for all the planets, as if of a

single organism), and the third member [is the measure] of the recycling that goes on in the realm of coming-to-be. It is due to this that the changes of the elements, and the reciprocal replacements of moving things, and rebirth have come to receive their existence. After this triad time advances in accordance with a variety of numbers, measuring the whole and demarcating everything with their own proper measures. We shall take up this later. HT

(4) Proclus *in Tim.* 3.83,18-84,1

We should go back to the lemma and make the following statement: 'So that there should be a measure' [*Tim.* 39B] does not refer to the conceptual measure, but to the actual thing that measures and demarcates the bodily motions, and gives rise to *visible* time. The phrase 'and it should travel around the eight paths' [*Tim.* 39B] applies to the measure, [and] it is clear that this measure pervades the measures applying to the routes of the eight paths and measures them out, for we state in terms of years the combined periodic return of the eight, and we are aware of the solar year because of the sun's light; for we ascertain through this what point of the ecliptic it is occupying, what part it is leaving, and what part it is approaching. Through these things [Plato] too explains how much time it takes to traverse its particular cycle, and we know in how many years all the circuits of the eight cycles are accomplished, being able to measure by the passage of the light both the sun's circuit and the common restoration-time (*sunapokatastasis*). [HT excises *toutôi... metrôi.*] HT

Reading

Paul Horwich, *Asymmetries in Time*, Boston, MA 1987, ch. 6, 'Time travel'.
Murray Macbeath, 'Who was Dr Who's father?', *Synthèse* 51, 1982, 397-430.
Richard Sorabji, *Matter, Space and Motion*, London & Ithaca, NY 1988, ch.10, 'Closed space and closed time'.
Susan Weir, *An Inquiry into the Possibility and Implications of a Closed Temporal Topology*, PhD diss., Bristol 1985.

11(c) Exact repetition of events collapses into single occurrence

Another theory, espoused by Pythagoreans and Stoics, was that history would repeat itself endlessly in linear time. Aristotle's pupil Eudemus uses Aristotle's definition of time as the countable aspect of motion in respect of before and after, to provide a refutation: since everything countable would be the same, the time would not after all be different, and there would be no repetition.

Someone who believed that indistinguishable times must be identical would be likely to side with Eudemus, and deny that there was repetition. If in addition no event looked like a first or last event, he might prefer the hypothesis that time goes in a single circle with each event lying in both past and future. W.V.O. Quine has argued (*Analysis* 39, 1979, 66-7) that these are not distinct hypotheses. But major differences in physics would emerge, if the postulated circle of time was a small one. Moreover, endless repetition, unlike the other hypothesis, could hardly accommodate chance (Sorabji, *Matter, Space and Motion*, ch. 10).

For Alexander's attack on the Stoic idea that it would be the same people in the next cycle, see **Logic and Metaphysics 6(h)**.

Eudemus' reply to the Pythagoreans:

(1) Simplicius *in Phys.* 732,26-733,1

One might be puzzled whether or not, as some people say, the same time recurs. For sameness is spoken of in different ways, and it does seem that a time the same in kind recurs, e.g. summer, winter and the other seasons and periods. Similarly, motions (*kinêseis*) the same in kind recur, for the sun will accomplish its solstices, equinoxes and other journeys. But if one were to believe the Pythagoreans' view that numerically the same things come again, and I shall tell this tale staff in hand, to you sitting like this, and everything else will be alike, then it is plausible that the time too will be the same. For when the motion (*kinêsis*) is one and the same, and similarly there are many things which are the same, their before and after is one and the same, and hence so is their number. So everything is the same, which means that the time is as well. RRKS

Reading

Richard Sorabji, *Time, Creation and the Continuum*, London & Ithaca, NY 1983, ch. 12.

Richard Sorabji, *Matter, Space and Motion*, London & Ithaca, NY, 1988, ch. 10.

11(d) Does time depend on soul?

Aristotle, having defined time as countable, infers in *Physics* 4.14, 223a21-9 that it depends on soul, for without conscious beings there would be no possibility of counting. He does not notice that although there would be no opportunity for counting, there could be an ability to be counted. Some of the commentators, including Boethus of Sidon, an Aristotelian of the first century BC, and Themistius, criticise him while others defend him. Alexander and Simplicius add the defence that Aristotle has in mind Plato's view that without soul as a source of change, there would be no change and hence no time.

(1) Boethus *ap.* Simplicium *in Phys.* 759,18-20

Boethus attacks this argument, saying that nothing prevents there being the enumerable quite apart from an enumerator, as there can be the perceptible without a perceiver. JOU

(2) Alexander *On Time*, trans. from Arabic attributed to Hunayn b. Ishâq, ed. Badawi 22,2-4, with reference to Latin of Gerard of Cremona's trans. from the Arabic, ed. Théry, 95,11-15

We say that without a soul to count motions there would be no time [lit.: if the soul which counts motions came to nothing, time would come to nothing]. Neither if there were no time, would the sphere be in motion. But

if it were not in motion, all motions would come to nothing. For it [is the motion of the sphere] which accounts for [lit.: is the reason for – Latin: *causa*] all of them, [Latin: and likewise for time]. FWZ

(3) Alexander *ap.* Simplicium *in Phys.* 759,20-760,3

But Alexander also stated the attack in several stages, and added a solution in accordance with Aristotle. He says: 'It is worth investigating how sound the statement is that there is nothing enumerable if there is nothing that will enumerate. That there is nothing enumerable or enumerated *qua* enumerated if there is nothing that enumerates can be allowed, if being enumerated is essential to number. But what is enumerable itself, i.e. what is capable of being enumerated, such as men or horses, does not seem to be annihilated with the enumerator. Aristotle himself shows that the before and after in change, which are enumerable, can exist without soul, at least if there can be change without soul.' Solving the difficulty he [Alexander] says: 'Perhaps the enumerable will not exist, but that which is contingently capable of being enumerable will exist, such as horses or men, but not the enumerable *qua* enumerable. For in the case of other relatives, if, for instance, there is nobody on the right, he who was on the left, Socrates perhaps, will exist, but a person on the left will not. So, if time were enumerable as the before and after are enumerable, if there were nothing to enumerate there would be no time. But nothing prevents the substrate of time, which is change, from existing.' JOU

(4) Simplicius *in Phys.* 760,11-26

He [Aristotle] very properly added 'if it is possible for change to exist without soul'; for, so far as the antithesis of relations goes, if soul be abolished for the sake of argument, nothing prevents there being change, even if not time. If, however, it is not possible for there to be change without soul, not only time but change also will be abolished in the absence of soul. For if the cyclic motion, from which all other motions and changes derive their existence, is governed by intelligence and design, as Alexander also agrees, if soul were abolished all change would be abolished. JOU

(5) Simplicius *in Phys.* 760,33-761,5

So Aristotle reasonably says that, if the soul *qua* enumerator is abolished, time will be abolished *qua* enumerable; but he shows that, if it were abolished *qua* the principle of coming to be and change, both change and coming to be would be abolished, by 'if it is possible for there to be change without soul'. But not only is time, being an aspect of change, abolished together with the abolition of change, but, since it itself has its being essentially in becoming, it will be abolished together with the abolition of soul, which is the acknowledged cause of all change and becoming. JOU

(6) Themistius *in Phys.* 163,1-7 = Simplicius *in Phys.* 766,13-19

But how, in the case of time, is it plausible that time is merely a concept of our souls, and has no nature of its own, as Aristotle seems to admit when he agrees that there will be no time if there is no soul? For to say that time is a measure and a number is to give in to that belief, as Boethus also says, since nothing becomes a measure in nature but measurement and numbering are our handiwork. JOU

(7) Themistius *in DA* 120,17-21

Thus by also referring to mankind as 'the maker of time' the commentator Alexander does not think that he has made an inappropriate claim, <yet> by making time directly our conception (*epinoia*) and thus not granting it its own real existence (*hupostasis*) he was wrong and unfaithful to Aristotle, if we must pay some attention to what is in the *Physics*. RBT

Plotinus, however, does define time as the life of the soul, though at 4.4 [28] 5, soul itself is above time and eternal.

(8) Plotinus 3.7 [45] 11 (43-62)

If someone were to say that time was the life of the soul in movement, as it changes from one stage of life to another, would he have a point?

Yes, he would; for if eternity is life at rest, unchanging, self-identical, timelessly infinite, and if time is to be an image of eternity, just as the sensible world is an image of the intelligible, then to correspond to its life there must be another life belonging to this power of soul, sharing the same name; and to correspond to the intellective motion there must be a movement of part of the soul; and to correspond to the sameness, the self-identity and enduring quality there must be something which does not remain the same but which has different activities; and to correspond to the unity and lack of extension there must be an image of unity, a unity of continuity; and to correspond to the timeless infinity and to the universality there must be infinitesimal distinction of time; and to correspond to the homogeneous whole there must be that which will always be partial yet always a whole. For in this way it will copy what is timelessly whole, homogeneous and present, if it wishes to increase its being – since it is in this way that its being will copy the being of that world. Therefore we should not think of time as being outside the soul, just as the eternity of that world is not outside its being; nor is it an adjunct of soul, or posterior to it, any more than eternity is an adjunct of being; rather it is seen within it, present in and to the soul, just as eternity is to being. BF

Iamblichus and Proclus demur: Time is above soul, as eternity is above intellect. It is partaken of by soul, but is itself intellective (*noeros*) and eternal.

(9) Iamblichus *ap.* Simplicium *in Phys.* 794,12-15

Furthermore we deny that time and with it the heavens were given birth with the process proceeding from the soul or from life, but say that it came from the intellective (*noeros*) ordering proceeding from the demiurge. JOU

(10) Proclus *in Tim.* 3.27,18-28

But if intellect is secondary to eternity, and soul is an imitation of intellect, how would it not be the case that time, being an image of eternity, is superior to the soul herself and more substantive. For as is intellect to soul, so is eternity to time, and vice versa. So time is prior to soul (just as eternity is prior to intellect), and time may be participated by soul, but time may not participate soul (as eternity cannot participate in intellect, but the reverse). So having an intellective (*noeros*) nature, time leads round the things, souls included, that participate it. For time is eternal (*aiônios*) and always the same, not only in its substance, but also in its inner activity. HT, RRKS

Simplicius takes pseudo-Archytas, whom he wrongly supposes to be the original Archytas, Plato's Pythagorean friend, to make time dependent on soul, and compares Plato and Aristotle. Plato makes movement, and hence time, dependent on self-moving soul, Aristotle on the unmoved divine intellect.

(11) Simplicius *in Cat.* 350,16-32

Now [Archytas] does not join [the Stoic and Aristotelian] definitions together, but establishes a single definition, one which is special [to time] and goes beyond the assertions of the other [definitions]: for he did not say that time is the number of *all* movement, as Aristotle defined it, but rather [the number] of a *certain* movement – not [the movement] of one of the particulars (*ta en merei*), such as the [movement] of the heavens or that of the sun or of some other definite thing among the particulars, since on that basis time would not be of the nature of a principle, nor would it extend commonly to everything, nor would it deserve to be defined among the primary genera. Instead, by means of this [definition], [Archytas] altogether expresses a movement which is of the nature of a principle and is the cause of being for the other movements. For people are accustomed in all cases to place foremost what has prior existence as a single form and is predicated homonymously of what [exists] subsequently, as for example the principle of man himself [is predicated] of the many men. So too here [Archytas] places a single movement foremost, as cause of the many [individual] movements, and, being the origin of movement, this [cause] had according to Plato [*Phaedrus* 245C7-D1] necessarily to be self-moving, while according to Aristotle [e.g. *Phys.* 258b10ff.] [it had to be] unmoved. In consequence it is plausible that [Archytas] is, by means of these [char-

acterisations], expressing the substantial movement of the soul, and the projection (*probolê*) [into the world] of the principles belonging to it by virtue of its substance, and the transition from some [principles] to others: for he says that this single and particular movement is appropriate to time. RG

(12) Simplicius *in Cat.* 351,8-18

But I admire the following feature of Aristotle's sagacity, namely how he too posited the soul as the proximate cause of time: for in seeking what it is which *numbers* [time], he talked of the soul [*Phys.* 223a25]. For if the soul is the origin and cause of all movement – whether *qua* self-moving, as Plato thought, or *qua* unmoved, as Aristotle thought – it will also, in all probability, be the cause of temporal movement. But given that Archytas says that the number [of time] is the generative time, which proceeds from the soul-movement as from its unit (*monas*), it is clear that he also regarded that movement as a unit of time, and so it would seem that he posits as time the primary movement in, and proceeding from, the soul, and within which all other movement is contained, arranged and measured – for the measurer ought to be articulated alongside the measured, and be more of the nature of a principle than it. RG

Augustine *Confessions* 11.20; 11.26; 11.27, addresses the problem of the unreality of the parts of time (see next section), by suggesting that past, present and future may be three states of mind, memory, attention and expectation. This provides a background against which can be understood the suggestion of *Confessions* 12-13 that the inhabitants of the heaven of heaven, who do nothing but contemplate God, are in a way freed from time.

(13) Augustine *Confessions* 11.20.26; 11.26.33; 11.27.36

As is now evident and clear, the future and past do not exist; nor is it proper to say, 'there are three times, past, present and future'. But perhaps it would be proper to say, 'there are three times, a present of the past, a present of the present and a present of the future'. For these three things do exist in the mind (*anima*), and I do not see them elsewhere. The present of the past is memory, the present of the present is attending (*contuitus*), the present of the future expectation. If we may speak this way, I see three times, and I acknowledge that there are three. ...

Thus it seems to me that time is nothing other than an extension (*distentio*), but of what it is an extension I do not know. It would be surprising if it were not an extension of the mind (*animus*) itself. ...

In you [my mind], I say, I measure times. What I measure is the effect (*affectio*), itself present, which passing things create in you, and which remains when they have passed away. In measuring times, I do not measure the things which passed in the act of creating that effect, but

rather the effect itself. Therefore either times *are* that effect, or I do not measure times at all. RRKS

Reading

Richard Sorabji, *Time, Creation and the Continuum*, London & Ithaca, NY 1983, ch. 7.

11(e) Paradoxes about the unreality of time and answers

(i) Time progresses by leaps

Aristotle's paradoxes about time provide the occasion for the Neoplatonists to explain their own theories of time. Aristotle discussed in *Physics* 4.10, 217b29-218a30 the paradox according to which time does not exist, because its parts do not. The past exists no longer, the future not yet, and the present is not a part, since it has to be a sizeless instant, lest it overlap with past or future. Damascius tries to introduce in reply a present which has size and cannot be whittled down. He borrows probably from Sextus (*Math.* 10.123-142; *PH* 3.76-8) an idea which had been used to solve some of Zeno's paradoxes of motion. Motion can occur cinematographically by discontinuous leaps, in which the moving body disappears from one spot and immediately reappears in another, without ever having been in between. It thus avoids having to traverse Zeno's infinite series of diminishing distances. Damascius' innovation is to apply the leap to the progress of time, whose measurement, after all, depends on the movement of clocks. The leap for him is a period of clock rest when time stands still, and the present is such a leap. Like the leaps of motion, it avoids objections to atomic theories, because you can divide it in thought. But it avoids being whittled down to a sizeless instant, because it is the smallest unit of measurement used by the Demiurge, and it has being, not merely coming to be. His idea may be that it comes into being all at once, not part by part, perhaps because the Demiurge allows no movements to punctuate its existence. Damascius thus introduces an extended present or 'now' as against Aristotle's sizeless present or 'now', which is a mere boundary of extended times.

(1) Damascius ap. Simplicium *in Phys.* 796,32-797,13

'I am impressed', Damascius says, and in these words, 'at how they solve Zeno's problem by saying that the movement is not accomplished in indivisible units, but rather progresses in a whole stride (*bêma*) at one go. The half does not always precede the whole, but sometimes the movement as it were leaps (*huperallesthai*) over both whole and part. But those who said that only an *indivisible* now existed did not recognise the same thing happening in the case of time. For time always accompanies movement and as it were runs along with it, so that it strides along together with it in a whole continuous jump (*pêdêma*) and does not progress one now at a time *ad infinitum*. [This must be the case] because motion obviously occurs in things, and because Aristotle shows clearly that nothing moves or changes in a now but only *has* moved or changed, whereas things have to change and move in time. At any rate, the leap (*halma*) in movement is a *part* of the movement which occurs in the course of moving and will not be moving at the now; nor, being present, will it occur in the non-present (*mê enestôs*).

So that in which the present movement occurs is the present time, and it is infinitely divisible, just as the movement is, for each is continuous, and every continuum is infinitely divisible.' RRKS

(2) Damascius *in Parm.* 2,241,29-242,5; 242,9-15 Ruelle

Or, as we were saying just now, time always flows and progresses by leaps, by an accumulation of progress by intervals, and each leap is a whole together and indivisible into parts. There is a different measure for different leaps, a shorter one for the slower star and a longer for the faster, which is why it traverses the same circle more quickly. And the times must differ, since the motions do. So also do the rests, for ....

To resume, these leaps are temporal measures marked off by demiurgic sections and in this way at least indivisible into parts. Each is a whole together, and must be said to display the halting (*episkhesis*) in the advance of time, and to be called a 'now' not in the sense of a boundary of time, but in the sense of a time which is demiurgically indivisible into parts, even if it is divisible in our thought, and that infinitely. For bodies too are all infinitely divisible; yet there are in bodies demiurgic sections which are indivisible into parts. RRKS

Reading

Richard Sorabji, *Time, Creation and the Continuum*, London & Ithaca, NY 1983, ch. 5.

(ii) Time has its being in becoming

Aristotle points out in *Physics* 3.6, 206a29-33, that for a day, or for the games, to be in existence, is for one part to be occurring after another. (They have their being in coming to be.) It is not like the being of a person or a house, where all the parts exist at once. So Damascius points out that it does not affect the existence of time if its past and future parts are not in existence, so long, presumably, as the present 'leap' is in existence. But Simplicius unwisely supposes that Damascius does not need his present 'leap' either, but can solve the problem by making Aristotle's point, which he also quotes from Alexander, that time has its being in coming to be.

(3) Simplicius *in Phys.* 797,27-36

However, neither the whole stride all in one go nor the leap over the whole of a part seems to me to make sense, when applied to motion or time. For place, whose parts stay put, I think we can contemplate bunching things together in this way. But for things which have their being (*einai*) in coming to be, we cannot take anything all in one go, unless we do so merely in our own thoughts. For what was taken all in one go would have to be taken not as flowing (*rheon*), but as static, and not as coming to be, but as being (*on*). Yet what has this character among the things which have their being in coming to be? One should rather listen to the following remarks of the

philosopher Damascius, and to what he said in his very own words [see next translation]. RRKS

(4) Damascius *ap.* Simplicium *in Phys.* 797,36-798,4

Moreover, a thing which is never at any time collected into one, but has its being (*einai*) in coming to be: That is what time is, in the form of day, night, month, or year. For none of these comes all in one go; nor does a competition (*agôn*), although a competition can be present (*pareinai*) so long as it is accomplished (*epiteleisthai*) a part at a time. Nor does a dance come all in one go, for this too happens part by part, and yet a person is said to be dancing the present (*enestôs*) dance. In this way too, then, the whole of time exists (*ephestanai*) by coming to be, but not by being (*ôn*). RRKS

(5) Damascius *ap.* Simplicium *in Phys.* 799,8-18

If, then, in saying this, my thought is not simply treading on thin air (*kenembatein*), I think I can on the basis of this thought solve the problems relating to time. For the first problem says: Since neither the past nor the future exists (*esti*), and since the time which is always being taken up, even infinite time, is composed of these, what is composed of nonexistents (*mê onta*) would be thought incapable of sharing in existence (*ousia*). Clearly, the person who raises this difficulty is pretending not to recognise the flow (*rhoê*) of becoming, and is not distinguishing things which have their being (*einai*) in coming to be from things which have their reality (*huphestôta*) all at once. Of the former one could say the reverse, that if part of them had not already happened, while some was yet to be, then some or all of their parts would have being (*einai*), [which is absurd] because being is quite inappropriate to these things; it is coming to be which belongs. And this is the way in which they have reality (*ho tês hupostaseôs tropos*), since the entire form (*eidos*) is continuously flowing (*rheon*). RRKS

(6) Alexander *ap.* Simplicium *in Phys.* 735,28-30

See now how clearly, as I think, Aristotle has expounded how time is the measure of change, that it is through the extension (*paratasis*) of its existence, which is principally how it has its being. 'For', as Alexander says, 'in the case of change, it is the same for it to exist and for it to be a change, as for all other things that have their being in becoming.' JOU

Reading

Richard Sorabji, *Time, Creation and the Continuum*, London & Ithaca, NY 1983, ch. 5.

(iii) Instants and segmentations of time exist only in thought

Damascius adds that they exist only relatively to us *ap.* Simplicium *in Phys.* 798,5-26 (cf. 799,18-30 above for their not having being in actuality). Damascius uses this to say that paradoxes about the passage of time are in a way unreal, and Simplicius agrees, saying that segmenting time distorts it by halting its flow. With 'relative to us' compare the modern idea that dating things as past, present and future is dating them relatively to our own act of dating.

(7) Alexander *ap.* Simplicium *in Phys.* 748,21-7

Also Alexander takes 'and [the now] divides [time] potentially' [Aristotle *Phys.* 4.13, 222a14] as going with the preceding statement that it is not plain as in the case of the point that remains; rather the now divides potentially. Such an interpretation is reasonable; so he says that the now divides time potentially, that is, for thought. For it does not do so actually, like a point, by having a position and remaining and exhibiting the parts as separate; for, because of the flow of time, the parts of time cannot be exhibited separate from each other. JOU

(8) Alexander *On Time*, trans. from Arabic attributed to Hunayn b. Ishâq, ed. Badawi 21,5-16 (with reference to Latin of Gerard of Cremona's trans. from the Arabic, ed. Théry 94,22-43)

The reason that we speak of time as a number, for all that it is single and evenly continuous, is that it is represented as a plurality in the mind (Latin: *estimatio*). For it will become [a plurality of] times only potentially and in the mind, not in actual existence. ... We say that there is time past and time to come. The present instant is in time as a point is in a line. Yet the difference between them is that the point is in the line in actuality, while the instant is [in time] only by mental projection (Latin: *estimatio*), not in actuality. ... If time is continuous, it is only in the mind that it divides into years, months, and days ... If it were divided in actuality, there would have to be between its parts an interval which would not be time [Latin: just as a motion is single and we cannot pass from one motion to another <without> there being something in between which is not motion. But between two times there can be no interval which is not time.] Therefore, time is single in actuality, however divided in potentiality. FWZ

(9) Alexander *On Time*, trans. from Arabic attributed to Hunayn b. Ishâq, ed. Badawi 24,7-9 (= Gerard of Cremona's Latin trans. from the Arabic, ed. Théry 97,5-9)

Time is intrinsically one. It is only in our minds that it acquires plurality as we represent it to ourselves in determinate parts [lit.: and make it determinate]. Thus we may say that [a time] 'was' or 'will be' solely in

accordance with our mental representation. In itself, [time] is one, for ever continuing in one and the same state. FWZ

(10) Damascius *ap.* Simplicium *in Phys.* 798,5-26

Similarly, the whole of time is present as coming to be, but not as in being. Again, we call the common properties of the forms eternal, as everlasting kinds, numerically in flux but statically the same in form. In this way we preserve the continuity which relatively to us (*hôs pros hêmas*) is divided into three and the time which is present for us (*kath' hêmas*). The present time is different for different people, whereas in itself it is one and continuous. All this being well said, we must say that the division of time is potential. And we must say that the simple now is a potential division [of time], but our thought does the dividing, and that this now exists as a boundary and as the simple, while we combine as static certain amounts of time, such as days, months and years, distinguishing them not by a single form. The emanation of these forms contains a large share of being, but it has its being in becoming. If anyone should wish to have the form static and all at once, he will no longer get this same thing that is coming to be, but that which is separate and removed, as a river exists in this world. For each river is a static form, from which the flowing river exists, getting its form in flux. If you halt the river, the river will no longer exist. In this way, then, the present, the past and the future are in form subsumed under the same form, but are unfolded in becoming, that which is ever coming into being being called the present, that which has perished the past and that which is not yet the future. Like process, the whole of time is continually in flux. By taking present time separately as being in actuality bounded by the nows on both sides, and stopping it all at once, one would have destroyed the form of time which has its being in becoming, as does process. JOU

(11) Damascius *ap.* Simplicium *in Phys.* 799,18-21; 27-30

But since the time which stands still in the now is thought to have subsistence and being, and since it is thought to be possible to solve the puzzle in this way, because [that time] is a *part* of divisible time, [our opponents, the paradox-mongers] try to show that the now is *not* a part of time by two dialectical arguments. ... Let that be taken as well said, for [it makes no difference, since] it is not in *that* now that time stands still. For the now defined [by them] does not have being in actuality, since if anyone grants being to the now which is a mere boundary of time, he will have to grant being to that which is bounded by it [which would defeat the paradox]. RRKS

(12) Simplicius *in Phys.* 800,21-4

Why, then, did Aristotle not solve the difficulties which he brought forward? It is because his argument called for the partlessness of now and its not existing in actuality (*energeiai*), which he demonstrates in the sixth book of the work [*Physics*] in his discussion of motion. RRKS

Reading

R.W. Sharples, in collaboration with Fritz Zimmermann, 'Alexander of Aphrodisias, *On Time*', *Phronesis* 27, 1982, 58-81.

(iv) *Per contra*, the now creates time by its flow

The parallel with the point creating a line by its flow appears to give more reality to the now, and is found in Simplicius *in Phys.* 722,30-4; cf. 726,8; and in Philoponus *in Phys.* 727,21-9; cf. 725,7-15, the last translated below at **11(g)**.

(13) Simplicius *in Phys.* 722,30-4

As, then, the same point, by flowing, makes the magnitude but is not set alongside another point, and as the identical moving object makes the motion, so the now, that is the same *qua* substrate, being numbered as earlier and later, defines and makes (*poiein*) time. JOU

(v) The whole of time exists simultaneously

Damascius sometimes goes further: Not only does the whole of time exist, but it exists simultaneously.

(14) Damascius *ap.* Simplicium *in Phys.* 775,31-5

But those things that he [Damascius] says do not disturb me so much, but rather those things that he often said to me when he was still alive, without convincing me, to the effect that the whole of time existed simultaneously in reality. I wish to expound and examine this thesis, which is also in his work *On Time*. RRKS

(vi) No time of time

Aristotle introduces another paradox of time in *Physics* 4.10, 218a8-21: when does the present instant cease to exist? His answer would no doubt be that it never is ceasing, but that it has already ceased at any subsequent instant you take, however close. Damascius would have several answers available, but the one recorded is that there is no time at which the present instant ceases, because you cannot postulate a time of time, on pain of regress.

(15) Damascius *ap.* Simplicium *in Phys.* 799,35-800,16

Next he [Aristotle *Phys.* 218a17] claims that, if the now passes away, it either passes away in itself or in another now, since what passes away passes away in time, just as what comes to be comes to be in time. It is clear that this account presupposes a time of time. Yet he himself denounced the idea that there is process of process [*Phys.* 5.2, 225b15]. In general, if we try to find measures of measures we shall go on without limit, taking as the measure of the yard-measure another yard-measure and postulating numbers prior to numbers. If those ideas are absurd, since each thing is able to give a share in its own special nature to others that require it, but does not need to share in the very thing which it itself is, that too is an absurdity. If anyone says that it does so need, he says so, I think, under pressure, and it pleases him that the measure should nonetheless give a share in itself.

So it is not necessary that time should pass away in time nor the now in the now. But there cannot be several at once, for in the flow of time the occurrence of the now is being seen against the background of some sort of conceived rest. But how, if time has its being in becoming, being itself in process, will it avoid needing a time to measure and order the parts of time, so that they do not pile up on each other? Surely time is in process in this way, as accompanying process as the measure of process. For even the yard-stick is distinct from what it measures, remaining in its true nature as a measure and not needing anything to measure it. RRKS

(vii) Static versus flowing time

Iamblichus learns of Aristotle's paradoxes from the neo-Pythagorean pseudo-Archytas, whom he wrongly takes to be the original Pythagorean who was before Aristotle. His answer to the paradox of the non-existent parts of time is that we must distinguish a higher time and a higher present existing in the realm of Platonic Forms. These indeed lack size and divisibility, but are not subject to the paradox because they do not flow. The lower time flows, but is not subject to the paradox, because the present here is a divisible stretch of time, and therefore a part of time, since indivisible units are not to be found in what flows: (16), (18), (20), (22), (24). Actually, even the lower time need not be thought of as flowing, if we think instead of the events or objects which participate in it as flowing instead, and as touching the present, now with the one part of themselves, now with another: (17), (24).

Pseudo-Archytas' formulation of the paradox: (16), (17):

(16) pseudo-Archytas *ap.* Simplicium *in Cat.* 353,13-15

Which is why time either does not exist (*esti*) at all, or is obscure and hardly exists. For how could it exist (*huparkhoi*) in reality (*kat' alêtheian*), if its past is no longer, its future is not yet, and its now is partless (*ameres*) and indivisible (*adiaireton*). RRKS

(17) Iamblichus *ap.* Simplicium *in Cat.* 354,28-34, reporting pseudo-Archytas

But when ([Iamblichus] goes on) Archytas says that the now and the time to come are not the same as the previous [time] (for the previous time has vanished and is no more, while the now as soon as it is thought of and has become current, has gone), such [claims], [Iamblichus] says, stand in need of a distinction for the sake of complete clarity: one should say that the whole of time is both the same and not the same, just like the now too – for in respect of its essence and its form [the now] is one and the same, but in so far as it divides the past and the future it is many and different things. RG

Pseudo-Archytas also raises Aristotle's other question, when the present instant ceases and Iamblichus responds. But since the lower now is not a sizeless instant, there is no particular problem about when it ceases: (17), (18).

(18) Iamblichus *ap.* Simplicium *in Phys.* 793,22-3

He [Iamblichus] wants not only a now [i.e. a mere instant] to be present (*enestêkenai*), but also a time between two boundaries [i.e. a stretch of time]. RRKS

(19) Iamblichus *ap.* Simplicium *in Cat.* 355,29-356,1

That is why, indeed, if one were to construe the now as a part of time, one would construe it as being naturally united with movement; if, however, one were to represent it not even as time [sc. let alone as a part of time], then it would, as some have certainly judged concerning it, be a separate *origin* of time, and would remain the same in form. And so when it is said that the past [portion of] time no longer exists and that the future [portion] does not yet exist, it is to be appreciated that this is said of the nows which issue forth [sc. from the now per se], are harmonised with movement, and are altered together with this movement, whereas the things which are included in the now [per se] and defined in it, and which never depart from their proper origin – these always remain in the now. RG

Separation of indivisibility from flow: (20), (21), (22), (23), cf. also (1).

(20) Iamblichus *ap.* Simplicium *in Phys.* 793,3-7

It looks then as if in these words Iamblichus is postulating one ungenerated now before the things which participate in it, and then [the nows] which are transmitted from this one to the participants. Just as with now, so also with time. There is one time before temporal things, and there are many times which come into being in what participates, so that in them one time is past, one present, one future. RRKS

(21) Iamblichus *ap.* Simplicium *in Phys.* 787,10-11

Iamblichus thinks we should understand partlessness (*ameres*) and unreality (*anupostaton*) to apply to different times. RRKS

(22) Iamblichus *ap.* Simplicium *in Cat.* 355,8-14

How then does the same thing come to be ever different, yet remain the same in form (*kat' eidos*)? How is it divided, yet indivisible? How does it alter, yet combine its beginning and end in one? It is because there is a difference between the now which participates in nature, and which is inseparable from things which come to be, and the [now] which is separate and by itself. One of these stands still (*hestêken*) in the same form (*eidei*) consistently (*hôsautôs*); the other is seen in continuous motion. RRKS

(23) Iamblichus *ap.* Simplicium *in Cat.* 354,9-26

So since time past is no longer, the future is not yet, and only the present (*enestêkos*) is thought to exist (*einai*), and since this is partless if taken at the now, and departs into non-existence simultaneously with existing, for this reason he [the reference is to the supposed Archytas] says that the peculiarity of time is to be partless (*ameres*) and unreal (*anupostaton*). But Iamblichus does not agree with those who see partlessness in connexion with this flowing and generated time, and who call it unreal because it never is, but is always coming into being. 'For whatever is coming into being', he says, 'and whatever is changing in any way cannot be partless. For every change is always divisible because of its continuity. The partless, however, is *eo ipso* stationary (*histatai*) and by its very being; if it were always *coming* into being, it would no longer preserve its form, while if it is expressly said to preserve its form, it cannot be always coming into being. So if [pseudo-Archytas] should say that the now is past, simultaneously with being thought and spoken of, we must postulate this kind of shifting (*ekstasis*) in the things which participate in time. For the things which come into being cannot take on the indivisible nature without changing, but touch that nature with ever different parts of themselves, and so falsely get their own character attributed to that nature. And this is why ever changing numerical difference is a mark of the difference of participating things, but the form remains the same and displays the sameness of the partless now'. RRKS

Things and events, not time, as flowing: (24), cf. also (23).

(24) Iamblichus *ap.* Simplicium *in Phys.* 787,17-20

And where should we think that the flow (*rhoê*) and shifting (*ekstasis*) of time occurs? We shall say in the things which participate in time. For these

are always coming into being and cannot take on the stable nature (*ousia*) of time [elsewhere: cannot take on the indivisible nature] without changing, but touch that nature with ever different parts of themselves. RRKS

Paradox of the ceasing instant:

(25) pseudo-Archytas *ap.* Simplicium *in Cat.* 352,29-30

But the present (*enestôs*) time has passed simultaneously (*hama*) with being thought of and with having come to be present (*enestakôs*). RRKS

Reading
Richard Sorabji, *Time, Creation and the Continuum*, London & Ithaca, NY 1983, ch. 3.

11(f) Does time require change?

Iamblichus' higher time is exempt from change and Damascius' leaps involve brief stillnesses. But Aristotle had defined time as a function of change, supporting this at *Physics* 4.11, 218b21-219a1 with what *looks* like a verificationist argument. We fail to *notice* time when, after a deep sleep in the suspended animation of a cave, we fail to *notice* change, so the *existence* of time requires the *existence* of change. Aristotle does not discuss the possibility (Sorabji, *Time, Creation and the Continuum*, ch. 6) that one might with unchanging thought notice it if everything had stopped changing. Galen thinks Aristotle's problem is that our thoughts have to change when we notice time, and he objects to inferring from this that time requires change. Simplicius replies that our thoughts do not have to change, and that is not Aristotle's claim. But it does *seem* to be. See further **11(j)** below.

(1) Galen *ap.* Simplicium *in Phys.* 708,22-709,13

So, if it is when we believe there is no change but are at the same now that we think that no time elapses, but it is when we are conscious of change and distinguish several nows, one as beginning, one as ending, one as earlier, the other later, that we are conscious of intervening time, it is clear that there is no time without motion or change. On the basis of these statements the remarkable Galen, in the eighth book of his *On Demonstration*, suspects that Aristotle says that there is no time without change because we conceive it as changing. He also draws an odd conclusion that 'the altogether unchanging also must involve change, if the thought of these also involves change for us. For we think of nothing with unchanging thought.' One might as well say that there could not be unextended things without extension, if we commonly think of them extendedly, using imagination. But first he ought to have observed that Aristotle does not mean that the soul changes, but that it is active, thinking it proper to call only physical changes changes. So he does not say that time is not without change because we think of it while undergoing change, but because the unchanging thought of change carries with it the thought of time. That this is what he is saying he makes clear also from his statement that even if we

change our thought, i.e. even if in thought we are active about change, but 'fail to notice the change, no time seems to have passed'. And, again, he says that we fail to notice the change not because we are not changing, but because we have no awareness of change; and, if he says that we are simultaneously sensible of change and time, he does not say that we change as we are so sensible. And even if someone might think that 'when we ourselves undergo no mental change' means the same as 'when we are not changing mentally', even so he does not think that time involves change because we ourselves change as we are aware of time, but because we track the change in thought, whether or not we ourselves change as we track it. That is why he added the correction 'or fail to notice the change'. JOU

Reading
Sydney Shoemaker, 'Time without change', *Journal of Philosophy* 66, 1969, 363-81.
Richard Sorabji, *Time, Creation and the Continuum*, London & Ithaca, NY 1983, ch. 6.

11(g) How can there be a single time, when there are many changes?

Simplicius answers that the changes have something in common. Philoponus gives Aristotle's answer (*Phys.* 4.14, 223b 10-12) that time for Aristotle is the *number* of change, and different changes can have the same number, and the same *now*, which is (more fully 727,21-9; cf. Simplicius *in Phys.* 722,30-4, translated at **11(e)(iv)**) what generates time by its flow.

(1) Simplicius *in Phys.* 720,20-6

This is because, while each changing thing has its own proper change, time is not thus the number of each distinct change, but of all as one. For the before and after as such is the same in all changes that occur simultaneously. For while one change is in this place, another in that, and while one is a local motion, another a growth, another a change of quality, it is not as such that they have a before and after, but in virtue of their common character as change. JOU

(2) Simplicius *in Phys.* 721,16-26

But perhaps, more in accord with Aristotle, we will say of the different changes, that, even if they differ from each other either in species or numerically, still the common feature of change, to have its being in becoming and to be ordered, is one and the same everywhere. The ordering is that in accordance with which their before and after that is found in the extension (*parata-sis*) of their being is determined, as is time also. For the before in my walking and of your becoming white, as change, if they are simultaneous, will be in the same now. Similarly the after will be in the same now, as is made clear towards the end of this book of the *Physics*. For even if the common feature of change is not transcendent and independent, but instantiated, though still retaining

its generality, it will be everywhere the same. For in that respect changes will not be separated, even numerically. JOU

(3) Philoponus *in Phys.* 725,7-15

Time, however, which is everywhere, is one and the same in number, so that it is clear in this way too that time is not change, but the countable aspect of change. [Aristotle] establishes from the now that time which is everywhere is one and the same. For the now, he says, by its nature is one everywhere, though differing in its description, since it is taken differently when taken as earlier or later, but taken as earlier it is one and the same everywhere, and similarly taken as later. So if the now is what generates time and the now is one and the same everywhere, clearly time also will be everywhere together one, both in nature and in number. RRKS

Reading

Cecilia Trifogli, *Oxford Physics in the 13th Century, c. 1250-1270: Motion, Infinity, Place and Time*, Leiden 2000, ch. 4.

11(h) Relativised time-frames

Plotinus at 4.4 [28] 5 (25-6), translated in **Logic and Metaphysics 18(c)**, speaks of souls that have visited the timeless intelligible world as having shed their memories of earth for a longer *time* (*pleiôn khronos*) than other souls. This must be time as measured by the *other* souls, since their *own* experience was timeless (see in **12** below). But this cannot be Plotinus' intention. For at 3.7 [45] 13 (66-8), translated in **Logic and Metaphysics 17(d)**, he takes it as obvious that there is only one time, and infers that, since time is a function of soul, in some sense all souls are one.

Damascius, it was seen in **11(e)**, only treated the division into past, present and future, not time itself, as relative to us, *ap.* Simplicium *in Phys.* 798,5-26.

11(i) Successive entities with temporal parts

We have seen in **11(e)** that Aristotle makes entities like games have their being in processes of coming to be, *Phys.* 3.6, 206a29-b3; 3.8, 208a20-1. One interesting aspect of Simplicius' discussion of 206a33 is his talk of divisions (*diairêmata* – I take Diels' *diairemata* to be a misprint), *in Phys.* 506,11, of temporally extended objects. Surprisingly, it turns out that a division is not superseded by the next division, but rather is said to be prolonged (*auxanesthai*, 506,13). This is unexpected, given Aristotle's claim that what you had before ceases to exist and Aristotle's point could well have been put by saying that the Olympic games, unlike an extended substance, has temporal parts. The Middle Ages took up this distinction between successive and permanent entities (see Cecilia Trifogli). But the distinction was sometimes denied, e.g. by Ockham, who thought we needed to postulate only permanent entities (see Marilyn McCord Adams), and in recent times by David Lewis, who sees even persons as successive entities with temporal parts.

Reading

Marilyn McCord Adams, *William Ockham*, Notre Dame, IN 1987.

David Lewis, 'Survival and identity', in Amelie O. Rorty, ed., *The Identities of Persons*, Berkeley & Los Angeles 1976, 17-40, repr. with postscript in Lewis' *Philosophical Papers*, vol. 1, Oxford 1983.
Cecilia Trifogli, *Oxford Physics in the Thirteenth Century*, Leiden 2000, ch. 4.

11(j) Animal and human awareness of time

Aristotle says that time is known not by reason, but by the primary *perceptive* faculty, *On Memory* 450a9-10, and this enables him to grant memory to some irrational animals. He even describes processes of mental imaging by which we estimate distance into the past, 452b7-15. But there is a worry in Themistius *in DA* 120, 10-17; Priscian *in Theophrastum* 4, 20-2; 'Philoponus' *in DA 3*, 579,39-581,19; 586,19-27, whether reason is needed after all, on two grounds, neither of them adequate. First, Aristotle says that appetite (*epithumia*) opposes reason, but only in those animals that *perceive* time, because intellect is concerned with the *future*, appetite with what is already the case (*to êdê*), *DA* 3.10, 433b5-10. But this, while giving to intellect some special concern with the future, continues to ascribe awareness of time to perception. And indeed, the commentators point out that irrational animals know when to migrate, and even in some cases store up food for the *future*, or avoid a *future* wound. Or is the lion, 'Philoponus' asks, merely restrained from attacking by a trace in its imagination of a *past* wound? This would be like knowing that there are too many beasts for a safe attack on them, but not being able to count that there are *three*, since counting requires reason.

Counting is relevant to the second worry, because Aristotle defines time as the *countable* aspect of a process, *Phys.* 4.11, 219b2, and it is intellect (*nous*) that counts, 4.14, 223a25. But for perceiving time, less than counting is required. Rather, according to 218b21-219a6, one needs to perceive a mental process within, contrary to Simplicius' interpretation in **11(f)** above. One may also be perceiving a physical process such as the movement of the celestial clock, but perceiving that, for Aristotle, involves also being aware of the mental process of perceiving. In the process perceived we can recognise more than one stage, and when we do, we recognise the passage of time. This is not yet to require that we have to *count* the stages, as opposed to recognising (as a lion can) that there is more than one. It is the existence of time, not the perception of it, that, according to Aristotle, introduces a requirement of *counting*, and even this is only, 4.14, 223a21-9, of the *possibility* of counting.

(1) 'Philoponus' *in DA 3*, 579,39-581,19

Having said this, he states a certain temerarious and hazardous syllogism in the first figure. This is the syllogism. Where there are contrary changes there is consciousness of time, and where consciousness of time, reason and appetite (*epithumia*). There are two hazardous things in this syllogism. One is that since he says that where there is consciousness of time there must be reason and appetite, from this it may be concluded that only human beings have consciousness of time. Against this we see that non-rational beings too are conscious of time. That is shown by the crane's flying off in winter to Thrace, and the ant's storing up in advance a treasury of nourishment for the winter. And the syllogism contains another absurdity. He says that where there are contrary changes there are reason and appetite, reason choosing the future good in place of the present pleasure

and appetite looking to the present or to the apparent good. So it may be concluded that according to him, only in human beings are there contrary changes. <But in non-rational animals too there are contrary changes>, as we have said, from spirit (*thumos*) contrary to appetite.

[14] Having raised these problems he resolves both, the first through three solutions. One is that non-rational beings do not have consciousness of time. For they do not lay hold of it by sense, for time is incorporeal and better than body, and is not contemplated by sense. And what non-rational beings do not know by sense they do not know by imagination either. So non-rational beings do not have consciousness of time because it does not fall under sense. That is the first solution . But so far as that goes, neither do we have consciousness of time. For we do not see it either, and that being so, neither do we imagine it.

[21] We should state, then, the second solution, that non-rational beings lay hold not of time, but things in time such as cold, heat and the like. So Aristotle speaks truly in saying that non-rational beings are not conscious of time; they lay hold of things in time and not of time. It is because we have rational soul itself that we have consciousness (*sunaisthêsis*) of time itself, counting off both hours and days. That is the second solution.

[27] The third solution is that by 'time' Aristotle means determinate time, not indeterminate. In this way, at least, he says in the *De Interpretatione* [16a13-18], 'some simply, some in time' meaning by 'simply' indeterminate time, and by 'in time' determinate time. Non-rational beings, then, even if they have consciousness of time, do not have consciousness of determinate time, but are conscious only of winter, say, or summer. Human beings have consciousness of determinate time because they count off days and hours. Counting is proper only to the rational soul. On this account, then, he says that only man has consciousness of determinate time, for non-rational beings too have consciousness of indeterminate. That is how he resolves the first point.

[37] He resolves the second by saying that where there are contrary changes there are also reason and appetite, if you add 'changes that come to be contrary relating to present and future time'. For only man undergoes contrary changes relating to the present and the future; non-rational beings [undergo them] only with relation to the present time. The sick man because of his present fever desires cold, his desire (*orexis*) bidding him to do this. But reason because of the future evil [that will result from doing it] fights back against desire. Non-rational animals undergo only contrary changes that are not because of taking thought in advance for the future.

[581,7] <But someone might say, 'Wrong, Aristotle'.> Let us suppose that a lion attacking a flock is wounded, and then later wants to attack another flock, but fearing the wound it received before, it does not attack so as not to suffer the same thing again. You see that it considers about the future so as not to suffer. So non-rational animals too occupy themselves with the future. Against this the commentators (*exêgêtai*) offer the defence that considering about the future on the basis of the past belongs to reason

alone. The lion, at least, does not take thought in advance for the future on the basis of the past; it is changed in accordance with imagination, since having a trace left behind of the [former] wound, it is restrained from attacking the flock for fear of a present wound. So it is active only about what is present. There is in it no discrimination of time any more than of number. The lion does not know what 2 is or 3, but only many and fewness, as is shown by its attacking a few, but fearing many. So much on that. WC

Reading

Daniela P. Taormina, 'Perception du temps et mémoire dans Aristote, *De memoria et reminiscentia* 1', in *Philosophie Antique* 2, 2002, 33-61.

On imperceptible times:

Richard Sorabji, 'Colour, light and imperceptibles', *Bulletin of the Institute of Classical Studies*, forthcoming 2004.

12. Eternity

Plato's *Timaeus* describes the Forms as eternal, 37C-38B *aïdios, aiônios*, borrowing from Parmenides' poem, fr. 8, line 5, the denial of 'was' and 'will be'. But he leaves it obscure whether eternity *(aiôn)* is timelessness, because he also uses temporal words like 'always' *(aei)*. Plotinus, in Sorabji's view, firmly settles the matter: 'always is' means 'truly is'. Eternity is timelessness, and this became the standard Neoplatonist view. Eternity is compared with an unextended point. Philoponus objects to the last: since it is a *measure*, it needs extension, *paratasis*, the term used above by Simplicius in explicating Aristotle's definition of time. Boethius distinguishes sempiternity or perpetuity from eternity as a name for existence at all times. Aristotle comes closer than elsewhere to expressing the idea of timelessness in *Cael.* 1.9, when he says there is no time, because no change, outside the heavens, and then, turns to 'the things there'. One of these is the physical heavens, viewed as divine. But is he also speaking of divine intellect, which is more familiar from other works and makes only occasional appearances in *On the Heavens*? If so, it may be timeless in a stronger sense than the physical heavens. Elsewhere Aristotle explains 'not in time', as meaning only 'not embraced by time', i.e. not shorter than time, *Phys.* 4.12, 221a13-b7. By that criterion, everlasting things would be not in time.

12(a) Its character

(1) Aristotle *On the Heavens* 1.9, 279a17-b3

So it is evident that there is neither place, nor vacuum, nor time on the outside. Which is why the things there are not of a nature to have a place, nor does time make them age *(gêraskein)*, nor is there change in any respect in the things which are arranged at a higher level than *(huper)* the furthest motion. Unchanging in quality and unaffected, they continue for the whole of *aiôn (diatelei ton hapanta aiôna)*, with the best and most self-sufficient life *(zôê)*. Indeed, the word *(aiôn)* was a divine utterance on the part of antiquity. For the completeness which embraces *(periekhon)* the length of life of a thing, and which is not naturally exceeded, is called its *aiôn*. By analogy the completeness of the whole heaven and the completeness which embraces *(periekhon)* the whole of time and infinity is *aiôn*. It takes its name from *aei einai* (always being), and is deathless and divine. On it depend the being and life of all other things, for some things more directly, for others obscurely. So also in popular [*(enkuklia)* see Simplicius *in Cael.* 288,31-289,2] philosophical works about divine things, it is often made evident by the discussions that the first and highest divinity must be entirely unchanged, a fact which bears witness to what I have said. For there is nothing else superior to cause movement (or else that thing would be more divine), nor does it contain anything bad, nor lack any of the

beauty that belongs to it. And it [the heaven] is in unceasing motion. For everything stops being in motion when it arrives at its proper place. But for the rotating body, the place from which it began and that at which it finishes are the same. RRKS

(2) Plotinus 3.7 [45] 6 (15-36)

So it does not contain any this, that and the other. Nor therefore will you separate it out, or unroll it, or extend it, or stretch it. Nor then can you find any earlier or later (*proteron, husteron*) in it. If then there is neither any earlier nor any later about it, but 'is' is the truest thing about it, and indeed is it, and this in the sense that it is by its essence and life, then again we have got the very thing we are talking about, namely, eternity (*aiôn*).

But when we say 'always' and 'not alternately existent and non-existent', we must view this way of speaking as a concession to ourselves. For 'always' is perhaps not being used strictly (*kuriôs*). Adopted for clarifying the imperishable, it may divert the soul into imagining a lengthening of something which is increasing and again of something which will not ever fail. Perhaps it would have been better only to describe it as 'being'. But although 'being' is an adequate word for substance, people thought that *coming* to be (*genesis*) was also substance, and therefore needed for their understanding to add in the word 'always'. It is not that being is one thing and always being another, any more than the philosopher is one thing and the true philosopher another. But because there was such a thing as pretending to do philosophy, the addition 'true' came into use. In the same way, always is added to what has being, and the word 'always' to the word 'being', so that we say 'always being'. And this is why we must take the 'always' as 'truly' being. The 'always' has to be included in that unextended (*adiastaton*) property which in no way needs anything beyond what it already possesses. And it possesses everything. RRKS

(3) Boethius *On the Trinity* 4, 60-72

But the 'is always' (*semper*) which is said of God signifies a single idea, as if he has been there in all the past, is there in some way in all the present, and will be there in all the future. According to philosophers, the same can be said about the heavens and the other deathless bodies, but it is not said of God in the same way. For he is always because 'always' in him belongs to the present, and there is a great difference between the present of our affairs, which is now, and the present of divine matters. For our now, as if running, creates time and sempiternity (*sempiternitas*), whereas the divine now stays not moving, but standing still, and creates eternity (*aeternitas*). If you add to that name the word 'always' (*semper*), you will create the continual, untiring, and hence perpetual race of that which is now, namely sempiternity. RRKS

(4) Boethius *Consolation* 5, prose 6, sections 4-14 Bieler, *CCL* 94

Eternity therefore is the whole and perfect possession all together (*tota simul et perfecta possessio*) of a life which cannot end, which becomes clearer from a comparison with temporal things. For whatever lives in time progresses as something present from what is past to what is future, and there is nothing placed in time which could embrace the whole extent of its life equally (*totum vitae suae spatium pariter*). It does not yet grasp tomorrow, and it has already lost yesterday. Even in today's life you do not live more than in the moving and transitory moment. So what is subject to the condition of time is not yet such as rightly to be judged eternal (*aeternus*), even if (*licet*), as Aristotle believed of the world, it never began to exist, and does not cease, but has its life stretched out with the infinity of time. For even if its life is infinite, it does not include and embrace the whole extent of that life all together (*totum simul infinitae licet vitae spatium*), since it does not yet possess the future and it already lacks the past. So that which embraces and possesses equally the whole completeness (*plenitudinem totam pariter*) of a life which cannot end, and for which there is not some of the future missing nor some of the past elapsed – that is rightly held to be eternal (*aeternum*). And it must be in possession of itself and always present to itself, and must have present to itself the infinity of moving time.

[9] Hence those are not right who, on hearing that Plato thought this world had no beginning in time and will have no end, think that the created world is in this way made co-eternal (*coaeternus*) with the creator. For it is one thing to be drawn through an endless life, which is what Plato attributed to the world, and another to have embraced equally the whole presence (*totam pariter praesentiam*) of a life which cannot end, which is clearly the distinctive characteristic (*proprium*) of the divine mind. Nor should God be thought older (*antiquior*) than created things by some amount of time, but rather by the distinctive character of his nature which is simple. For this status of his motionless life as present is [merely] imitated by that infinite movement of temporal things; and since the latter cannot represent or equal the former, it lapses from immobility into motion, and shrinks from the simplicity of presentness into the infinite dimensions of future and past. Since it cannot possess equally the whole completeness (*totam pariter plenitudinem*) of its life, it seems to some extent to emulate what it cannot completely express, in so far as it in some way never ceases to be. It does so by tying itself to whatever present it is which attaches to this tiny fleeting moment, a present which bears some likeness to the present which stays still, and so it bestows on what it touches an appearance of being. But since it could not stay still (*manere*), it seized on an infinite journey in time, and thus became such as to continue by travel a life whose completeness (*plenitudinem*) it could not embrace by staying still (*manere*). Thus if we want to apply names appropriate to the

things, let us say, following Plato, that God indeed is eternal (*aeternus*), but the world perpetual (*perpetuus*). RRKS

(5) Philoponus *contra Proclum* 114,20-116,1

Suppose eternity (*aiôn*) measures the being of eternal things (*aïdia*), as time measures the motion of the heavens, which is what Proclus himself says in the following passage: 'Time is the measure of the motion of the heavens, as eternity is the measure of life of the living being itself.' Well then, if eternity is the measure of the life of the living being itself, or at any rate of eternal (*aïdia*) things, it is absolutely necessary presumably that eternity (*aiôn*) should not be a single point (*sêmeion*), but a sort of breadth (*platos*) and extension (*paratasis*) stretched out, so to speak, alongside (*sumparateinomenon*) the being of eternal things (*aiônia*). It should not be cut, like time, into distinct segments, I mean, years, months, nights and days. Rather, it is like this: If someone halted the heavens and the motion of the sun in his thoughts, there would no longer be distinct segments of time in his mind, and yet there would nevertheless be in his mind a sort of extension (*paratasis*) running along (*sumparatheousa*) evenly together with the being of the cosmos. In the same way surely one can say of eternal things (*aïdia*) that, even if there is not a motion of temporal length (*khronikon diastêma*) for the eternity (*aiôn*) which measures their being, nevertheless there is at any rate a sort of uniform extension (*paratasis*) thought of together with their being. For eternity (*aiôn*), as I said, is not some point without parts (*ameres sêmeion*), nor do eternal things (*aiônia*) exist merely at some single point: which is indeed why Proclus said that eternity (*aiôn*) was a measure of the life of eternal things (*aïdia*), and before him Plato. For Plato says [*Tim.* 38B], 'time has come into being with the heavens, in order that, having been created together, they may be dissolved together, if ever their dissolution should come about, so that [the heavens] may be as like the model as possible. For the model has being for the whole of eternity (*aiôn*), but [the heavens] right through the whole of time.' So, if Plato says that the paradigm for the *kosmos* has being for all eternity, and is the measure of life of eternal things (*aïdia*), clearly he does not think that eternity (*aiôn*) is some single point, for all is not a point, nor does a measure lack parts (*ameres*). Rather, he thinks eternity is some single, uniform extension (*paratasis*), not cut by any differentiation, but staying always (*aei*) the same, and remaining without change in itself. RRKS

Reading

W. Beierwaltes, *Plotin über Ewigkeit und Zeit*, Frankfurt 1967.

Martha Kneale, 'Eternity and sempiternity', *Proceedings of the Aristotelian Society* 69, 1968-9, 223-38.

Richard Sorabji, *Time, Creation and the Continuum*, London & Ithaca, NY 1983, ch. 8.

Richard Sorabji, *Matter, Space and Motion*, London & Ithaca, NY 1988, 133 n. 36.

Eleanore Stump and Norman Kretzman, 'Eternity', *Journal of Philosophy* 78, 1981, 429-58.

12(b) The happy life requires no prolongation since it is eternal

(1) Plotinus 1.5 [36] 7, translated under **Psychology 17(d)**

(2) Plotinus 1.4 [46] 13 (6-12), translated under **Psychology 3(e)**

13. Place and Space

13(a) Aristotle's definition of place: problems of immobility

The most important source for theories of place is Simplicius, *Corollaries on Place* (*in Phys.* 601,1-645,19) and discussion of the category of Where (*in Cat.* 357,7-364,36).

Aristotle, after apparent acceptance in *Categories* 6, 5a8-14, later in *Physics* 4.4, denies there is such a thing as three-dimensional space. All we need is the concept of a thing's place, and Aristotle's definition of this dominated much of the Middle Ages in the Latin West, but did not on the whole impress other Greek philosophers and was even rejected by Strato in his own school. A thing's place, according to Aristotle, is the immobile inner two-dimensional surface of its immediate surroundings. Aristotle is thinking not just of its position, but of the exact place it fits into. A thing's exact place should be in contact with it, so as to be the same size. The surrounding surface in contact was invoked in order to secure exact fit, immobility in order to secure position. We shall see that combining these interests, of exact fit and position, led to problems.

Many objections were raised, some foreseen by Aristotle himself. The hardest was perhaps a question that concerns position, namely how to treat something whose immediate surroundings are not immobile, for example a boat moored or drifting in a flowing river. Immobility is needed, so that the boat can change or retain its place according to its own movements, not those of the water in relation to it. At one point Aristotle suggests that, although the water is moving, the river as a whole, i.e. as a geographical entity, is not (*Physics* 4.4, 212a14-21), and it has been suggested (Burnyeat) that he means the rim of the hole round the moored boat to derive immobility from the river. But when the boat moves, will the rim (despite the river's immobility) not move with it, so that the boat (absurdly) retains its place? Or will the earlier rim have been destroyed along with a series of instantaneous successors?

The problem applies also at the cosmic level, where Aristotle sees the earth at the centre, surrounded by water as its place, with surrounding air as the place of water, a surrounding spherical fire-sphere as the place of air and the surrounding spherical heavens as the place of the firebelt. Every single one of these places might be thought to be moving, although Aristotle sometimes exempts what is rotating (*Phys.* 4.5, 212a31-b1; *GC* 1.5, 320a21-4) like the heavens and the fire-sphere, in that only the parts, not the whole, change their place, and the same might be said of the non-rotating elements, water and air, taken as a whole.

A solution is alluded to by Aristotle's pupil Eudemus, according to Simplicius, and is developed in one direction by Thomas Aquinas, *in Phys.* in lib. 4, lectio 6, trans. Richard J. Blackwell *et al.*, London 1963, paras 468-9. Burnyeat points out that the solution has some basis in Aristotle *Phys.* 4, 209a32-3; 211b28-9; 212a21-4; 212b17-22. It has been elaborated in a different direction by Morison. Eudemus says that to find something immobile, we refer places to the heaven, which rotates but does not move as a whole. We must remember that in the geocentric system, the heaven is a sphere surrounding us on earth. The earth is thought of not only as central, but as down, the heaven not only as peripheral, but as up. The heaven

cannot move as a whole. Its parts move, as they rotate, in relation to landmarks on the earth, but the whole keeps its relation to those landmarks constant. We can now think of the rim round the moored boat as stationary in relation to the heaven, the rim round the moving boat as moving in that same celestial relation.

That the rim round the moving boat is moving with it fits our intuitions better than the previous idea that it derives immobility from the geographical river. But it still leaves Aristotle with problems. For on his account, if the boat is to be moving, it should be moving in relation to a stationary rim. He would do better to separate his appeal to surrounding rims, which are required for exact fit from any appeal to the immobile heaven, which is required for positions retained or changed. Positions can be determined by direct reference to the heaven, without any appeal to intervening rims.

Thomas Aquinas defines the place of a boat as the spatial relation (*ordo*) of the successive water surfaces that contact it to the whole immobile river, which is in turn fixedly related to the heaven with its immobile centre and poles.

Aristotle's friend and successor Theophrastus raises five puzzles, which are elaborated by Simplicius (cf. Philoponus), who also reports the reactions of Theophrastus' fellow-pupil Eudemus and others. First, Aristotle puts a three-dimensional body in a two-dimensional place, which only dubiously meets his requirement of equal size. Secondly, all the cosmic places, as explained, and many other places too, seem to be in motion. The third and fourth problems will be treated in **13(b)** below. The fifth problem is that if a thing's surroundings are removed (he probably means replaced), it will have no place, presumably because there will not be an immobile surrounding surface. Theophrastus adds that change of place will turn into relative change (the boat loses place without changing itself), something which was seen above under **2** to be rejected by Aristotle, and, though approved by Theophrastus, was not conflated by him with change of place.

Aristotle's initial description of place, *Phys.* 4.4, 212a5-6 (not translated) makes only the requirement of exact fit, as also 211a24-34; 212a29-30. But the final definition, 212a20-1, adds the immobility requirement. Aristotle explains that a mobile container would be a vessel, rather than a place, 212a14-19, which is why he appeals to the river as a geographical entity, instead of to its flowing water. Simplicius, reacting to the fact that the exact fit requirement has made place into a surface, comments that place has become two-dimensional, *in Phys.* 601,19-20.

Aristotle's definition and immobility requirement:

(1) Aristotle *Phys.* 4.4, 212a14-21

And as a vessel is a portable (*metaphorêtos*) place, so place is an immobile (*ametakinêtos*) vessel. And that is why when something moves and changes within a thing that is [itself] moving, like a boat in a river, it uses its surroundings [sc. the water] as a vessel rather than as a place. Place, however, ought to be immobile (*akinêtos*), which is why it is rather the whole river that is place, because the whole is immobile. So (*hôste*) the first immobile boundary (*peras*) of the surroundings is what place is. RRKS

Exact fit requirement and Simplicius' comment:

(2) Aristotle *Phys.* 4.4, 211a24-34

And when we say that [something] is in the universe (*ouranos*) as in a place, [this is] because it is in the air, and this is in the universe. And it is not in the whole of the air, but because of the [inner] boundary of [the air], which surrounds it, we say it is in the air (for if the whole of the air were its place, the place of each thing would not be equal to the thing itself, whereas it is generally thought that it *is* equal, and of such a kind is the most immediate (*prôtos*) thing in which [the object in question] is). When moreover the surrounding body is not divided [from the object], but is continuous [with it, the object] is said to be in it not as in a place but as a part in a whole; but when it is divided [from it] and in contact [with it, the object] is in the most immediate [inner] boundary of the surrounding body, which is neither a part of what is in it, nor greater than [its] diameter but equal [to it], for the boundaries of objects in contact are in the same [place]. ARL

(3) Aristotle *Phys.* 4.4, 212a29-30

Again [an object's] place coincides with the object, for limits coincide with what is limited. ARL

(4) Simplicius *in Phys.* 601,19-20

Of those who said that it is extended, some said that it is two-dimensional, like Aristotle and all the Peripatetics, some that it is three-dimensional. JOU

Theophrastus' objections:

(5) Theophrastus *ap.* Simplicium *in Phys.* 604,5-11 (= FHS&G 146)

Remember that in his *Physics* even Theophrastus raises puzzles (*aporei*) such as the following against the definition of place given by Aristotle:
(i) A body will be in a surface.
(ii) Place will be in motion.
(iii) Not all body will be in a place – not the sphere of the fixed stars.
(iv) If the spheres are taken together, the heaven as a whole will also not be in a place.
(v) Things in a place will no longer be in a place if, without their changing themselves at all (*mêden auta metakinêthenta*), their surroundings (*periekhonta*) are removed. RRKS

Objection concerning exact fit:

(6) Simplicius *in Phys.* 604,33-605,2

But the second of the presuppositions was that the place was as great as what is in the place. But how is it possible for a surface to be as great as a body? If it were, a point would be as great as a line, and a line as a surface, and thus a point as great as a body. What could be more absurd than that? For it is clear from the fact that he says that what moves by local motion is in place that body is naturally in place. JOU

Objections concerning immobility:

(7) Simplicius *in Phys.* 603,28-604,5

Further, if things in something moving are in it as in a vessel rather than in a place, as he himself explains saying: 'So when something moves and changes within a thing that is [itself] moving, like a boat in a river, it uses its surroundings [sc. the water] as a vessel rather than as a place' [212a15], then the planetary area will be within the fixed sphere as in a vessel and similarly each sphere of the planetary area in that surrounding it. Moreover, all the sublunary, which changes by local motion and which he says is properly in place, this too is within the limit of the heavens as in a vessel, since it is within the hollow surface of the sphere of the moon; for the sphere of the moon is also in motion. Where, then, is place, i.e. what things are properly in place? For both air and water are in motion, while individual bodies in general are in flux in the air or water. JOU

(8) Simplicius *in Phys.* 605,26-35

Further, if the lunar sphere moves in a circle, and if the sphere of fire also moves in a circle with it, as Aristotle agrees in the *Meteorologica* [341b18], then this above will, according to his own definition, distinguish not kinds of place but of vessel, as he defined it. For he says [*Phys.* 412a16-19], 'when something moves and changes within a thing that is [itself] moving, like a boat in a river, it uses its surroundings [sc. the water] as a vessel rather than as a place'. For he says [212a18-19], 'place ought to be immobile'. Therefore, in his definition also, he says [212a20] that 'the first immobile [boundary] of the surroundings is what place is'. So if what he calls the above does not distinguish kinds of place, but of vessel, clearly the same applies to the below. JOU

(9) Simplicius *in Phys.* 606,32-607,9 (partly in FHS&G 147)

Now Theophrastus and Eudemus themselves accept the immobility of place also as a postulate, but Aristotle makes an addition to the postulate, saying: 'So that the first immobile boundary of the surroundings is what place is' [*Phys.* 212a20]. Yet he says that what is in place all changes its place. But now everything is contrariwise, if place is the limit of the

container; for earth and water are at rest, but the limit of the air that contains them is in motion. Further, if place has to be immobile, either Aristotle says falsely that place is the limit of the heavens that touches bodies in motion, or, if that is true, the heavens ought to be immobile in order that their limit also might be immobile. For if they are in motion their limit will not be immobile. But it is clear that he holds that the heavens are in circular motion, and the perceptible facts bear witness to it. So it is necessary either to loosen up the postulate that says that place is immobile, or else not to say simply that place is the limit of the container. JOU

Eudemus' solution, appealing to the heaven as immobile:

(10) Eudemus *ap.* Simplicium *in Phys.* 595,5-9

[Eudemus], having said that place would be the surrounding boundary of the immobile surroundings, added: 'For what is moving is like a vessel and it is for that reason that we refer places to the heaven. For the heaven does not change its place. If anything, only its parts do, for the rotation is in the same [place]'. RRKS

Aristotle's appeals to the heaven as immobile. Earth is within the surrounding heavenly sphere, just as it is within the universe, at the centre, which is also called 'down':

(11) Aristotle *Phys.* 4.2, 209a32-4

One kind of place is shared, in which all bodies reside, the other is unique, the first immediate place. I mean, for example, you are now within the heaven, and in the air .... RRKS

(12) Aristotle *Phys.* 4.4, 211b28-9

[Air and water exchange places] not in the place where they come to be, which is a part of the place which is the place of the whole heaven. RRKS

(13) Aristotle *Phys.* 4.4, 212a21-4

It is for this reason that the centre of the heaven's [vault] and the furthest edge from us of the rotation is thought to be most of all for everyone and strictly up and down, because the centre stays still, while the furthest edge of the circle remains the same. RRKS

(14) Aristotle *Phys.* 4.5, 212b17-22

And it is for this reason that everything is within the heaven. For perhaps the heaven (*ouranos*) means the whole universe (*to pan*). But their place is

not the heaven [itself], but the [inner] edge of the heaven, a stationary boundary which is in contact with the moving body [below]. RRKS

Reading

Keimpe Algra, *Concepts of Space in Greek Thought*, Leiden 1995.

Keimpe Algra, 'Place in context: on Theophrastus fr. 21 and 22, Wimmer', in W. Fortenbaugh and D. Gutas, eds, *Theophrastus: His Psychological, Doxographical and Scientific Writings*, Rutgers University Studies in Classical Humanities, vol. 5, New Brunswick 1992.

Myles Burnyeat, 'The sceptic in his time and place', in Richard Rorty *et al.*, *Philosophy in History*, Cambridge 1984, 232-3, n. 15.

Edward Grant, 'The medieval doctrine of place: some fundamental problems and solutions', in A. Maierù and A. Paravicini Bagliani, eds, *Studi sul XIV secolo in memoria di Anneliese Maier*, Rome 1981, 57-79.

Ben Morison, *On Location: Aristotle's Concept of Place*, Oxford 2001.

Richard Sorabji, *Matter, Space and Motion*, London & Ithaca, NY 1988, ch. 11.

13(b) Aristotle's definition of place: no place of the cosmos or the heavens

Theophrastus' remaining two puzzles open up a set of problems that the heavens will have no place, or at least the outermost sphere which carries the non-planets will not, nor will the cosmos as a whole, because these have no surroundings. Aristotle's pupil Eudemus raises the same problem about the heavens. The heavens create an extra problem because they rotate, and so at least their *parts* need to change place, as Aristotle admits, even if he pleads that in rotation the whole does not change place, *Phys.* 212a31-b1; *GC* 1.5, 320a21-4 (not translated). This plea is accepted by Eudemus (*ap.* Simplicium *in Phys.* 595,8-9 above), Alexander (595,20-2 below) and Themistius (*in Phys.* 120,17-19, not translated), but rejected by Simplicius (*in Phys.* 595,22-6 below) and Philoponus (*in Phys.* 565,1-8; 565,14-16, not translated). Things are made harder by Aristotle sometimes saying that the fixed parts of something move only accidentally in virtue of the whole moving (*Phys.* 6.10, 241b1; *DA* 1.3, 406a6-12).

Another part of Aristotle's answer is that inner celestial spheres can have as their immobile place spheres further out (*Phys.* 4.5, 212a32-4; b12-14), presumably on the understanding that the rotation of spheres further out is not a genuine change of place. But this leaves the problem of the outermost celestial sphere. Aristotle's further effort to find special senses of 'in' does not solve the problem.

Eudemus (below) offers two answers, that each individual star is in the outermost surface as its place, and that the whole heavens, like other wholes, can be said in a different sense to be *in* their parts.

Themistius (below) offers a solution that the outermost sphere could have as its place the surface of the next sphere in, that of Cronus or Saturn. Simplicius (*in Phys.* 590,27-32; 592,25-7, not translated) and Philoponus (below) reject this, partly on the ground that such a place would not be of equal size. Philoponus adds that the surface of the next sphere in cannot provide a place to the outermost sphere, when it also receives its place from there.

Pseudo-Archytas (below), who is not interpreting Aristotle, speaks as if the place of the whole cosmos is supplied by its own outer boundary, not by the inner boundary of its surroundings. The genuine Archytas, we shall see, raised a problem as to how there could be nothing beyond the outer boundary of the cosmos.

For Theophrastus, Proclus, Damascius on the place of the cosmos, see below.

(1) Eudemus *ap.* Simplicium *in Phys.* 595,9-15

[Eudemus continues from 595,5-9 in **13(a)** above,] 'But are the heavens themselves in a place or not, and how could either be so? For they are not in place as a whole, unless there is something outside; in that way they would be surrounded; we shall look into this. The stars and everything within the outermost body are in its boundary at which it is a container. Things thus in something are said to be in place, whereas that in which parts are we call a whole. Viewed in this way, the heavens are in a place. But they are also somewhere in another way; for the whole is in its parts, since "somewhere" is ambiguous.' JOU

(2) Simplicius *in Phys.* 595,15-26

[Continuation of (1)] He [Eudemus] has stated in what ways and how contingently the whole heavens are in a place. But it is worth noting what sort of change rotation is. It is clearly not substantial nor qualitative nor quantitative; so, if it is a change, it remains that it is change of place. But what changes place is definitely in a place, as has often been shown. But Alexander clearly says that this sort of change is not change of place, because no place is exchanged. But he does not say what sort it is, although Aristotle clearly says in *On the Heavens* that it is change of place, which he calls locomotion, which he divides into circular, straight and mixed motion; there he says that 'everything moving locally, does so either in a circle, or in a straight line or a mixture' [*Cael.* 1.2, 268b17; cf. *Phys.* 8.7, 261b28]. Also he clearly says in the eighth book of this work [*Phys.* 8.9] that rotation is change of place. JOU

(3) Themistius *in Phys.* 121,1-4

Not all the parts [of the heaven] are in a place, for not all of them have surroundings, nor is the outermost sphere in a place. On the inside it would be in a place, for it touches the sphere of Cronus and is in a way surrounded by it, but on the outside it totally lacks any place. RRKS

(4) Philoponus *in Phys.* 565,21-566,7

So some exponents [Themistius] say the place of the sphere of the fixed stars is the convex surface of the sphere of Cronus [Saturn], openly abolishing all the commonly agreed assumptions about place, posited by Aristotle himself, that place is outside that which is in place and contains it, and that place is equal to that which is in place. For in what respect could they claim in this case that place is equal to what is in place? Moreover, it follows from saying this that the same thing in the same respect is both place and in place; for if the sphere of Cronus in respect of its convex surface is the place of the sphere of fixed stars, but again in respect of that same

surface, which is contained by the fixed sphere, is in that as in place, it follows that the same thing, namely the sphere of Cronus, in the same respect, namely its convex surface, both is the place of the fixed sphere and also is in that as in place. And how could the same thing both be the place of something and have as its place that very thing whose place it is? How can the same thing take on opposite relations with respect to the same thing? It is impossible for the same man to be both father and son of the same man, if the right conception of the relation in question is preserved. In this way, then, those who say the sphere of fixed stars is in place in this manner abolish the common conceptions about place. DJF

(5) pseudo-Archytas *ap.* Simplicium *in Cat.* 363,21-9

Archytas too assigns this special feature to place, saying: 'The distinguishing mark of place is that other things are in it, but it itself is in nothing: For if it were [itself] in some place, then the place [sc. surrounding it] would again itself be in some other [place], and the process would go on to infinity. It is therefore necessary that while other things are in place, place [itself] is in nothing, but rather relates to existents as limits relate to the things which are limited: for the place of the whole world is the limit of all things that exist'. Iamblichus remarks: 'Archytas clearly states here that the special feature of place is to be the limit of things limited *in any way at all*, unless, that is, by "things that exist" he means the bodies with which the categories are concerned.' RG

Reading
Ben Morison, *On Location: Aristotle's Concept of Place*, Oxford 2001.

13(c) Place as an immobile, three-dimensional extension, potentially vacuous

Given the difficulties in Aristotle's account, many other theories of place and space flourished. This one is ascribed to most Platonists and the Aristotelian Strato and is endorsed by Philoponus. The atomists Democritus and Epicurus are cited as taking a third view, that space is sometimes actually vacuous.

(1) Simplicius *in Phys.* 601,19-24

Of those who said that it is extended (*diastaton*), some said that it is two-dimensional, like Aristotle and all the Peripatetics, some that it is three-dimensional. Of these, some said that it is absolutely homogeneous and sometimes remains without any body, like the followers of Democritus and Epicurus, some that it is an extension (*diastêma*), always containing body and fitted to each, like the well-known Platonists and Strato of Lampsacus. JOU

(2) Simplicius *in Phys.* 618,20-24

But others make it equal in extent to the corporeal universe, and say that for that reason it is empty in its own nature, but is for ever filled with bodies and is only notionally seen as existing in itself. Many of the Platonic philosophers were of this persuasion, and I think that Strato of Lampsacus held this view. JOU

(3) Philoponus *in Phys.* 579,6-9

So place-extension (*topikon diastêma*), too, even if in its own right it could subsist by itself (for what could prevent space from being empty of body, as we said, if we think of the jar containing no body inside it?), does not, all the same, ever remain empty of body all by itself. DJF

Reading

Christopher Martin, 'Non-reductive arguments from impossible hypotheses in Boethius and Philoponus', *Oxford Studies in Ancient Philosophy* 17, 1999, 279-302.

David Sedley, 'Philoponus' conception of space', in Richard Sorabji, ed., *Philoponus and the Rejection of Aristotelian Science*, London & Ithaca, NY 1987.

13(d) Proclus: place as a supracelestial light

The light in question is not ordinary light, but that described in Plato *Republic* 10 in the myth of Er.

(1) Proclus *ap.* Simplicium *in Phys.* 612,24-613,1

'To draw together all that has been demonstrated, place is a body that is immobile, indivisible and immaterial. If so, it is very obvious that it is also more lacking in matter than all other bodies, both those in motion and even those among them that are immaterial. So that, if, of these, light is the most simple (for of the other elements fire is the least corporeal, but light less so than fire), it is clear that place should be light, the purest among all bodies. Accordingly', he [Proclus] says, 'we should envisage two spheres, the one of light, the other consisting of many bodies, equal to each other in bulk. Situate the one about the centre, and put the other inside it, and you will see the whole universe within place, moving within the immobile light, being itself immobile as a whole, in imitation of place, but having moving parts, in order to be in that way inferior to place.' Having said this, he [Proclus] confirms his account from Plato, who says that light, akin to the rainbow, which is mentioned in the *Republic* [616B], is place. JOU

(2) Proclus *in Remp.* 2,198,25-9

So if the most divine of moving objects are lights, how much more so is that

body [the place of the world] light. Let us then say in sum what the bond that connects heaven and earth [Plato *Rep.* 616C2 calls this light the *sundesmos* or bond of the heaven] has been defined to be: it is an immovable, indivisible body, whose substance is light. RW

Reading
Lucas Siorvanes, *Proclus*, Edinburgh 1996, ch. 5, 235-56.
Richard Sorabji, *Matter, Space and Motion*, London & Ithaca, NY 1988, ch. 7.

13(e) Theophrastus: relational theory?

Max Jammer and Shmuel Sambursky have taken Theophrastus to be treating place in anticipation of Leibniz, and contrary to his master Aristotle, as a relative arrangement of bodies, although Keimpe Algra thinks any such suggestion would have been tentative and ad hoc. Sorabji instead suggested that Theophrastus might be talking only of the *natural* places of parts in living organisms and in the entire cosmos viewed in Theophrastus' manner as if it were a living organism. Natural place, according to Sorabji, is supposed by Aristotle to help explain natural movement, but only in the sense that it is in the nature of the four cosmic elements, earth, air, fire and water, to seek to be in their natural places which serve as final cause of the movement. Theophrastus, it is suggested, finds this unexplanatory: What the parts of an organism seek is to be in the right spatial relation to other parts and to the whole in the light of the natures and powers of parts and whole (see under 22). This could have enabled Theophrastus to answer the question he puts to Aristotle how the heavens have a place. They will in relation to the whole cosmos.

Algra sees Theophrastus as differing much less from Aristotle on natural motion: for Aristotle, he suggests, it is not place, but being in a place, that attracts each element, and Theophrastus would accept this, if natural place is construed like place in general, as a relation instead of a surface.

(1) Theophrastus *ap.* Simplicium *in Phys.* 639,13-22 (= FHS&G 149)

Theophrastus too appears to have had this conception of place in his *Physics* when he continues his account in the form of a puzzle (*hôs en aporiai*), and says: 'Perhaps (*mêpote*) place (*topos*) is not a reality in its own right (*kath' hautou ousia tis*), but we speak of it because bodies have an order and position (*taxis, thesis*) in accordance with (*kata*) their natures and powers (*phuseis, dunameis*). And similarly in the case of animals and plants and in general of non-homogeneous things, whether animate or inanimate, if they have a nature that exhibits form (*emmorphos phusis*). For in these too there is an order and position of parts in relation to the whole being (*ousia*). And this is why everything is said to be in its own space (*khôra*) through having its proper order. For each part of the body too would desire and demand its space and position'. RRKS

Reading
Keimpe Algra, *Concepts of Space in Greek Thought*, Leiden 1995, ch. 5.
Keimpe Algra, in W. Fortenbaugh and D. Gutas, eds, *Theophrastus: His Psychological,*

Doxographical and Scientific Writings, Rutgers University Studies in Classical Humanities, vol. 5, New Brunswick 1992, 141-65.
Max Jammer, *Concepts of Space*, Cambridge 1954, especially p. 21.
Helen Lang, *Aristotle's Physics and its Medieval Varieties*, Albany, NY 1992, 63-84; 97-124.
Ben Morison, *On Location: Aristotle's Concept of Place*, Oxford 2001.
S. Sambursky, *The Physical World of Late Antiquity*, London 1962, especially ch. 2.
Richard Sorabji, *Matter, Space and Motion*, London & Ithaca, NY 1988, ch. 12, 202-4.

13(f) Iamblichus: place actively holds bodies together

This is part of Iamblichus' intellective viewpoint (*noera theôria*). He rejects Plotinus' complaint that Aristotle's categories will not apply to the intelligible world, by arguing that they apply there in a special sense. But a *dynamic* account of place is needed, in his view, to show how it can fit all the cases. Place is not an inert surrounding, but a *sustaining* surrounder and a sustaining surrounder of many different kinds of thing.

(1) Simplicius *in Phys.* 639,36-640,11, reporting Iamblichus

So Iamblichus himself rejected other approaches that make place something unconnected with things in place, and says that place is of like nature with things in place. Continuing, he says: 'What view, then, clearly states the perfection of place and its kinship with being? It is that which treats place as a power of corporeal character which sustains bodies and holds them apart, raising up those that have fallen and uniting those that are scattered, filling them up and surrounding them on every side.' So he seems himself to give a definition of place in which he calls it a 'power of corporeal character', akin to what is in place, 'which sustains bodies and holds them apart, raising up those that have fallen and uniting those that are scattered, filling them up and surrounding them on every side'. It is also clear that, if place fills bodies up, it cannot be separated from what is in place. It surrounds bodies in such a way as to bound them and unify them. JOU

(2) Simplicius *in Cat.* 361,7-362,33, reporting Iamblichus and pseudo-Archytas

Iamblichus adds to all these points an intellective viewpoint (*noera theôria*), and he asks first whether the objects themselves which are in a place define the place around them or with them, or whether the place defines the objects, since it delimits them (*sumperainein*). And he says that if, as the Stoics say, place subsists [merely] as parasitic (*paruphistasthai*) on bodies, then it will also adopt its definition from them, to the extent that it is completed by the bodies [sc. on which it depends]. If, on the other hand, place has being (*ousia*) per se, and no body can exist at all unless it exists in place – as Archytas seems to want to signify – then place itself defines

bodies and delimits them in itself. For if place were inert (*adranês*), having its being in infinite void and extension, without any subsistent reality (*hupostasis*, in contrast with *parupostasis*), then it would also receive its definition from without. But if it too has an active potentiality and a determinate incorporeal being, and if it does not permit the separation of bodies to proceed more or less indefinitely, but rather defines them within itself, then plausibly it will also furnish bodies with their limit from itself.

[361,20] Archytas too made this clear when he said: 'For since everything moved is moved in a particular place, it is clear that place must subsist first, in which the moving or undergoing thing is to be. And thus perhaps this thing [i.e. place] is indeed the first of all things, given that all things that exist either exist in place or at least not without place.' He clearly hypothesises place to be prior to agents and patients, and since things in place always coexist with place, he therefore says [that place is] 'perhaps first'. But if the things that exist either exist in place or not without place, it is clear that place does not subsist [merely] as parasitic on the things that exist. And if one takes the substantial (*ousiôdês*) place, or the place of life, or the specific (*eidêtikos*) place, or the place containing [things] potentially, then all things that exist have their being in such a place. But if one thinks of place as the bare limit of the surrounding thing and as the incorporeal surface, then [even so] the things that exist do not exist without place, not because the limit is a random accident of them, nor because one- and two-dimensional things are posterior to what has three dimensions, but because the [362,1] surface surrounding them is the originator of bodies and, supporting them from itself, surrounds and defines them within itself. That is why indeed bodies have their being in place, as being surrounded by it and as confining their own dimension within its dimensionless nature. For incorporeal being has been universally treated as prior to corporeal. Hence too place, being incorporeal, is superior to the things that exist in it: it is superior to the things which are deficient and need to be in place, since it is more self-sufficient than them. For place is the consummation (*teleutê*) not just of bodies, as some think, but also of the shape around them and of the life within them and of the forms around them and of all the potential and being there is in them. Place is the common limit of all these things, so that we ought not to think of place as a *bare* limit – as we think of mathematical surfaces as being [bare] limits of mathematical bodies – but rather it is to be defined as being the physical bounds of physical bodies, as the life-supporting bounds of animate creatures, as the intellectual limits of intellectual beings, as the most potent [limits] of potential things, as the specific [limits] of specific things, and similarly for the other [limits], appropriately to each [domain], in order that the limits really be akin to all those things that they delimit within themselves.

[362,16] Following these points we ought to consider place in accordance with the [notion of] *surrounding* and in accordance with the whole genus of *surrounding* (*periekhein*), and we ought to define the things in place in

accordance with the [notion of] *being surrounded*. Now let no one think of the surrounding as a bare extension (*diastêma*): for not even the extension of the universe is inactive (*argon*), but it is filled up, in the case of forms with all manner of forms, in the case of living beings with all manner of living beings, in the case of potentialities with all manner of potentialities, and similarly in the other cases. Thus one should think of place not only as surrounding and situating within itself the things that are in place, but also as sustaining them by a single power, for in this way place will not only surround bodies from without, but it will also fill them throughout their entirety with its uplifting power. The bodies sustained by that [power], left to their own nature, would fall away, but once they are lifted up subject to the control of place they will exist in it in this manner. Hence the opinion of the many, which defines place to be the limit of the surrounding thing, insofar as it [i.e. that limit] has dimension, says that [the limit] is the extreme of the surrounded place and is what supervenes on the end as a [mere] accompaniment. But the opinion which in its reasoning embraces the limit in accordance with the very cause and origin [of things' being in place] does not speak of it as one of the accidents surrounding place, nor as one of the things which are around it [i.e. place] [merely] at the end, but conveys it [i.e. the limit, so understood] as its [i.e. place's] whole being and earliest cause. RG

Simplicius infers that this dynamic place is a thing's unique place (*idios topos*) and moves with it, when it moves, as opposed to the shared (*koinos*) place.

(3) Simplicius *in Phys.* 629,8-12

They think that place is immobile (*akinêton*), because they concentrate on this broad, shared (*en platei, koinos*) place. For the unique (*idios*) place of a thing which is essentially united (*sunousiômenos*) with it certainly moves with it (*sunkineitai*), but the shared place which is thought of as broad stays still (*menei*), as being unique to a more universal and embracing (*holikôteron, periektikôteron*) body. RRKS

(4) Simplicius *in Phys.* 637,25-30

Now the place which is unique (*idios*) to the position (*thesis*) of the parts of a thing is both inseparable (*akhôristos*) from the thing and moves with it (*sunkineitai*) when it moves. But, as Syrianus himself used to say, the broad place which is involved in motion from place to place, is unique to a different body, the more universal one, and is inseparable from that, and moves with it, if it should chance to move, whereas it is both separable from the body contained within it and immobile in relation [reading: *hôs pros*] to it. RRKS

Reading

Richard Sorabji, *Matter, Space and Motion*, London & Ithaca, NY 1988, ch. 12, 204-7.

13(g) Damascius, as elaborated by Simplicius

(i) Unique (*idios*) place (*topos*) and position (*thesis*)

An organism's unique position and place keeps its parts in the right arrangement, as time does for events.

(1) Simplicius *in Phys.* 625,13-17

The extension (*diastasis*) in respect of size and bulk has immediately come to be in a position (*thesis*). But this [position] is also of two kinds. One kind is naturally united (*sumphutos*) with essence (*ousia*), as for example in my body my head's being up and my feet down. The other is adventitious, as when I have my position sometimes in the house and sometimes in the market. RRKS

(2) Simplicius *in Phys.* 626,8-27

So it is because of place, which arranges each of our parts well (*euthetizein*), that my head has come to be on top of my body and my feet below. And the liver is on the right, the heart in the centre, the eyes by which we see when moving forward are in front, and the back on which we carry loads is behind .... It is also because of place, then, that the parts of the cosmos have their proper good arrangement (*euthetismos*) in the universe... As the parts of the earth and of the heaven are variously arranged (*tetaktai*) here and there because of place, and some are, it may be, in the North, others in the South, so it is because of place that the whole heaven and the whole earth, which are parts of the cosmos, have the correct measurement (*eumetria*) of their position and have the cosmic ordering (*diakosmêsis*) which falls to them, with one occupying the circumference of the universe and the other its centre. RRKS

In this sense, the whole cosmos has a place:

(3) Simplicius *in Phys.* 631,7-31

In reply to the second difficulty raised [for Damascius' view, viz. that if place is the well-ordering of *parts*, wholes will lack a place], it should be said that, even if we say that place is the well-ordering of the parts, none the less the whole, also, is given its situation by it. For just as what is well-tuned, even if it is well-tuned in virtue of the proper proportion of the parts to each other, is still said to be well-tuned as a whole, so what is arranged and well-ordered, even if it becomes so in virtue of its parts, since all ordering is through discrimination, is still itself what is arranged. A thing put into its place will be in the same case. Also a measured whole is measured through its parts. But we say that place is a certain arrangement and measure or demarcation of position. When we say that the whole is unified, do we not say that the whole is unified through the unification of its elements? Yet, viewed as a whole and one without distinction of parts,

we should not say that it was harmonised or unified, but that the whole is unified with respect to its parts. So we say that a body is well-positioned and well-placed just as having each of its parts in the appropriate position.

[631,20] You must see that just as we say that the parts belong to the whole, so we say that the places of the parts in which the parts are situated belong to the whole, such as the middle and the outside; reasonably so, since there are parts of the whole position, just as low and high notes are part of the same scale. So there is, in truth, the whole place of the whole universe, but it has its supreme position through the good arrangement of its parts and through its whole good arrangement in respect of its parts. For differences of place, the above and below belong to the whole and are judged in relation to it, just as, if my head alone of my body happened to exist, it would not be said to be situated above according to the above in the total being. In general, we do not say only that the parts have a well-arranged position in relation to each other and to the whole, but also that the whole has it in relation to its parts. JOU

A thing's unique place in that case moves with it *pace* Aristotle, if it moves.

(4) Simplicius *in Phys.* 629,8-12; 637,25-30, translated under **13(f)** above

Place is not the position of an organisms' parts, but the measure of that position, a measure which can be thought of as a flexible mould (*tupos*) into which the thing fits. Damascius and Simplicius here put the emphasis on Aristotle's exact-fit criterion of place.

(5) Simplicius *in Phys.* 645,4-17

It is clear that he [Damascius] says that place is the measure of position, well-disposing what is situated there. But he defines it not only as the measure of this but also of magnitude *qua* magnitude. For he says shortly afterwards: 'It is like a preliminary outline of the whole of position and of its parts and, as one might say, a mould into which that which is situated there has to fit, if it is to be properly situated and not be muddled up in an unnatural state. Examples would be a whole larger or smaller than the proper size, or situated in the whole where it is not seemly, or whose parts do not have their proper position like a man with his brain in his heels, as they say.' Thus clearly he judges place to be concerned not only with well-positioning but also with the size of an extended thing being greater or less. But I think that he should have defined four measures, number, magnitude, place and time, the first measuring division, the second extension (*diastasis*), the third all kinds of position, the fourth endurance (*paratasis*) in becoming. JOU

(ii) Shared place and position

Shared (*koinos*) place and position can be adventitious, e.g. being in the market, or proper, e.g. the earth, or air, as a place for different animals.

(6) Simplicius *in Phys.* 625,13-17, translated above

(7) Simplicius *in Phys.* 626,8-27, translated above

(8) Simplicius *in Phys.* 627,16-17

But since position is of two sorts, one essential, the other externally imposed, so place will be of two sorts, one being an element perfecting that which has a position, the other contingent. JOU

(9) Simplicius *in Phys.* 627,31-2

In this way the place of land animals is the place of the earth, and in this way the earth occupies the middle of the whole. RRKS

(10) Simplicius *in Cat.* 364,22-9

Time is of two kinds, and place is of two kinds as well: For [there is] a sort [of place] which is naturally united with and individual to each man, which conserves this hand and this organ on the right, that [hand] and that [organ] on the left, the head up above the windpipe, and the feet below, under the groin. And [there is] common [place], some [places] being more common than others: For the earth and air is a place for all land animals, and this or that particular part of the earth and air [is a place for merely some of them], and to go still further [in narrowness, there is] the [place] immediately surrounding [each thing], which both Aristotle and Archytas assigned [to place]. RG

The place of the air, though not unique to a single animal, is unique to the air, and would move with the air if it moved:

(11) Simplicius *in Phys.* 629,8-12, translated above under **13(f)**

(12) Simplicius *in Phys.* 637,25-30, translated above under **13(f)**

(iii) Immediate place is perishable

The immediate place I occupy in the air, though a measure, perishes when I leave it.

(13) Simplicius *in Phys.* 632,6-26

Just as we say that those things change in time that leave one time and take over another, even if the first time comes to an end, so those things which leave the demarcation of their position and take over another may be said to change their place, even if the first place always comes to an end. In the same way we say that things exchange their quality if they were formerly white and later become black, not because the whiteness that the

blackening thing discards remains behind on its own. Also things that come to be and pass away alter in substance, and things that alter in quantity increase and diminish, though their previous condition does not remain behind. So we should not require former places to be preserved when things exchange their place. Nor in our case when we change our position are the places preserved, as when I cross from here to there; but it is the whole of the surroundings that are preserved, and their place, which is able once again in one of its parts to coincide with my interval. Just as I, though in a different position, retain potentially a coincidence with that part of the whole and the demarcation of its position. For this reason I am able to again become coincident with it and to have the demarcation of my position, i.e. my place, in that part, since the whole place of the air measures my extension in a portion of itself and gives me a position in the whole of the air. Also, as Aristotle himself presupposes, the necessity of vacating a place does not mean that the boundary of the air surrounding me remains when I withdraw from it. JOU

(iv) Place, as intelligible unit of measurement in the mind, is unextended

Damascius and Simplicius.

(14) Simplicius *in Phys.* 634,11-31

In reply to the fifth of the difficulties raised [for Damascius' view], which enquires whether such a place is extended or unextended, we say that place is a prerequisite as a measure of extension in position. Every measure requires to be equalised to what is measured, or, rather, to make the object measured equal to itself. But the transcendent measure, that exceeds the object measured through its superiority in power and its unity of being, carries up the measured object towards its own concentration, giving a share in itself so far as is possible, just as we say that the intelligible numbers measure everything through their concentrated supremacy over all things. Such entities are measurers rather than measures.

[634,20] The well-ordered condition, as being a participation by the measured in the measurer and being coordinated with the measured object, is extended with and stretched out beside it, just as our cubit is an extended measure deriving from the unextended measurer, that is, the cubit in the soul. So also time is extended together with change. There is the same problem with time also, as to whether it is itself extended or unextended. It is clear that this participating time, or rather the participation, is divided into parts together with change and accompanies it everywhere. It unifies its spread and scattered parts, or, to speak truth, it exists as the unification of the parts unified. The place also that exists together with bodies is extended with them. For everywhere it is the position of bodies and the determination of their position. JOU

Simplicius takes the receptacle of Plato's *Timaeus* 48Eff. to be another example of unextended place, because it is like Aristotle's prime matter, which was commonly conceived as an unextended recipient of properties, although we shall see below under **17(e)** that Simplicius himself views prime matter as an extension.

(15) Simplicius *in Phys.* 601,17-19

Of those who said that [place] is altogether unextended, some said that it is a substrate for bodies, like Plato, who calls matter place; others said that it brought bodies to completion, like our own Damascius. JOU

Reading
Richard Sorabji, *Matter, Space and Motion*, London & Ithaca, NY 1988, ch. 12.

13(h) Simplicius

Place is not extension (*diastasis*), but an extended substance:

(1) Simplicius *in Phys.* 623,18-20

But neither is place an accident; it too [sc. like body which is in it] is substance (*ousia*), for it is not extension (*diastasis*) plain and simple, but extended space (*khôra*). RRKS

Place is hard to distinguish from form:

(2) Simplicius *in Phys.* 638,26-7

The essential place, being naturally united with essence (*ousia*), can scarcely be distinguished from essence, but the other varies at different times while the essence remains unchanged. It thus easily strikes us and alerts our judgement by its difference from the essence. JOU

(3) Simplicius *in Phys.* 630,24-30

In the same way it [the form: *eidos*] also has its position ordered with a good configuration because of place. So let us not seek to separate the form from the participation in the spatial which is essentially united with it and to see it as well arranged in its own right. That would be just like our separating its perfection from it in thought and none the less insisting on regarding it as perfect even without. RRKS

Reading
Richard Sorabji, *Matter, Space and Motion*, London & Ithaca, NY 1988, ch. 12.

14. Infinite Space

Is there infinite or extracosmic space? The Aristotelians said 'no'.

14(a) Pythagoreans, Archytas: finitude would require an edge

Pythagoreans, Archytas: yes, for what would happen on the edge?

(1) pseudo-Archytas *ap.* Simplicium *in Phys.* 467,26-35

Archytas, according to Eudemus, put the question this way: If I came to be at the edge, for example at the heaven of the fixed stars, could I stretch my hand or my stick outside, or not? That I should not stretch it out would be absurd (*atopon*), but if I do stretch it out, what is outside will be either body or place – (it will make no difference, as we shall discover). Thus Archytas will always go on in the same way to the freshly chosen limit (*peras*), and will ask the same question. If it is always something different into which the stick is stretched, it will clearly be something infinite. If it is a body, the thesis [that body is infinite] has been demonstrated, while if it is a place and place is that in which body exists or could exist, and in the case of eternal things we must trust what could exist as actually existing, then on this option too body will be infinite, and so will place. RRKS

14(b) Reply to Archytas

On the Aristotelian view of place as a function of surroundings, beyond the cosmos, there is not place in the absence of surroundings, but nothing. So Alexander(?):

(1) Alexander(?) *Quaest.* 3.12, 106,37-107,4

He will not stretch out his hand; he will be prevented, but prevented not as they say by some obstacle bordering the universe (*to pan*) on the outside, but rather by there being nothing (*to mêden einai*). For how can anyone stretch something, but stretch it into nothing? How can the thing come to be in what does not even exist (*to mêdê holôs on*)? In the first place, nothing would have any desire to stretch any of its limbs in nothing, for such is the nature of what has no existence. RRKS

(2) Simplicius *in Phys.* 467,35-468,3

Perhaps this argument will create a keen problem also for us who say that

there is nothing outside the heaven, since the body of the cosmos, whose limit is the heaven, has matter as its space (*khôra*). Because of that, if someone came to be on the back of heaven and stretched out his hand, where would it stretch? It could not stretch into nothing (*mêden*), for no existent thing is in what does not exist (*to mê on*); but neither will the man be prevented from stretching it out, for one cannot be prevented by nothing. RRKS

(3) Simplicius *in Cael.* 285,21-7

But the answer which Alexander himself presented is a better one, that if the cosmos is the whole universe (*to pan*), and nothing is outside the universe, the supposed situation is like someone trying to stretch his hand into the non-existent (*to mê on*). If he were to stretch it out, it will be a place that receives his hand, and not the non-existent, while if he were unable to stretch it out, there will be an obstacle. So the supposition is absurd (*atopos*), since in imagination it assumes in advance what it seeks to prove, that there is something, whether empty or solid, outside the universe. RRKS

14(c) Reply to Aristotle's argument that place must be able to receive body

Reply to Aristotle's argument that since bodies cannot reach outside the cosmos to be received, there is not anything there which can receive them: Cleomedes the Stoic, who draws most of his arguments from the Stoic Posidonius, replies to Aristotle (*Cael.* 1.9, 279a11-18) that you might as well say that there cannot be a water vessel in a desert that cannot receive water, since a water vessel by definition can receive water. He is right in that the inability of matter to be received proves only a lack of opportunity, not a lack of ability, to receive it. But the difference between ability and opportunity is not obvious and it affected (above) arguments on determinism concerning the nature of alternative possibilities, and arguments on time, concerning the need for conscious beings if time is defined as countable.

(1) Cleomedes *de Motu circulari* 1.1.81-8 Todd

Aristotle and the people of his school (*hairesis*) do not allow void outside the cosmos either. For, they say, void must be a container (*angeion*) of body, and outside the cosmos there is no body. So there is no void either. But this is simple minded, and very much like saying, 'since it is not possible (*hoion te*) for there to be water in dry and waterless places, it is equally impossible for there to be a utensil capable (*dunamenon*) of receiving water'. It should be recognised, then, that a container of body can be meant in two ways, either as something containing body and filled by it, or as what is capable (*hoion te*) of receiving body. RRKS

14(d) Aristotle's argument that what is limited need not be limited by something

Aristotelian reply to the objection that what is limited must be limited by something further out: definitions of limitedness do not imply this (Aristotle *Phys.* 3.8, 208a11-20). The argument is greatly expanded by Alexander(?), who illustrates the point by offering three sufficient conditions for a whole being limited, none of which implies a limiting agent outside. I have interpreted these three conditions in *Matter, Space and Motion*, ch. 8, at 135-8, as follows. First, a whole can have a limit, if it has a limit in Aristotle's sense of a first rim outside which you cannot take anything. Secondly, in Alexander's(?) view, a thing will be limited, if it can be divided into an equal number of segments. Thirdly, a whole can have a limit if it consists of a limited number of parts of limited size, where this last reference to the limitedness of the parts can be understood in the opponent's way, as being limited by other parts. What is the meaning of 'limited number' in Alexander's(?) suggestion? Simplicius reports, *in Phys.* 516,29-38, Alexander's remark that a number can be limited (*peperasthai*) without possessing a limit (*peras*) at all. Simplicius thinks this impossible, but surely Alexander is right.

(1) Alexander(?) *Quaest.* 3.12, 104,24-9

But if what is limited is what has a limit and what is able to be divided into equal parts and what is composed of limited parts, none of which has its being in having something outside itself, those who suppose that everything limited is limited up against something will not be supposing any of the things included in the *being* of what is limited, but a certain accident of the things to which the property of being limited belongs <as> parts of the totality. RWS

(2) Alexander *ap.* Simplicium *in Phys.* 516,29-32

Surprisingly, Alexander seems to say, 'it is not true that what is limited (*peperasmenon*), as limited, has a limit (*peras*). At any rate, a number is limited, but certainly does not have a limit.' Yet how can anything be limited, if it does not have a limit? RRKS

14(e) Aristotelian definition of 'whole'

The Aristotelian definition of 'whole' means that 'whole universe' implies 'limited in extent': Aristotle's definition of whole at *Phys.* 3.6, 207a8-10; *Metaph.* 5.16, 1021b12 was discussed above under **10**. It is so related to his definition of limited at *Metaph.* 5.17, 1022a4-5, as to suggest Alexander's(?) result.

(1) Alexander(?) *Quaest.* 3.12, 102,15-18

But if it is necessary for there to be some whole, to which [as] a totality what is and is spoken of as a part is referred, and a whole and a totality are the same (for each of them is defined by none of its parts being absent),

something which is like this will be limited, if what is limited is that of which no part is absent. RWS

14(f) Philoponus' definition of 'place'

Philoponus' definition of place as a three-dimensional extension whose essence does not require it to be filled with body leaves room for an outer edge of place: Philoponus' infinity arguments were shown above to rule out an infinite past. He cannot easily then allow infinite space, yet, unlike Aristotle, he did not treat empty space as a contradiction in terms. Nonetheless, he argues that space can be thought of as having a limit, whether or not that limit is derived from the limitedness of bodily matter.

(1) Philoponus *in Phys.* 582,19-583,12

But they again raise a difficulty for our view, and say that if there is such a thing as this extension (*diastêma*), empty so far as its own nature is concerned (*tôi idiôi logôi*), in order to receive bodies, it will have to be infinite, for it will have no boundary (*peras*). For the boundary of three-dimensional things is a surface, and what could serve as the surface of such as extension, seeing that surfaces subsist only in bodies. Thus if the whole body of the heavens up to its outermost surface is spread through it, but it itself cannot have a boundary, it must spill outside the heavens infinitely far, which is both irrational in itself, and also sufficiently refuted by Aristotle both in this work and in *On the Heavens*.

[582,28] But I do not know how such a difficulty could even seem to be persuasive. For first, just as one can conceive such a thing as being three-dimensional, so one can conceive a surface appropriate to it. Secondly, even if one could not conceive a surface appropriate to it, it does not follow of necessity that the void stretches to infinity. For since the place (*topos*) of bodies is something that exists, it exists for as great a distance as the cosmic bodies can spread, and has a boundary together with (*sumperatousthai*) the boundaries of those bodies. Compare the interior of a jar: If it is thought of as empty, and various bodies are put in it, not continuous with each other, but merely in contact, so that each occupies a part of the place inside, then each part of the empty space must (*anankê*) have a boundary together with (*sumperatousthai*) the body which it has received, and the entire empty space up to the concave surface of the jar must have a boundary (*peratousthai*), since all the bodies inside have boundaries out as far as that concave surface. It is the same with the whole universe: Each of the spheres in it takes up a bounded (*peperasmenon*) part of the empty space, and the whole of empty space has a boundary together with the whole cosmos. It has a boundary (*peras*), only not a boundary of its own. For it is not impossible to conceive of a surface for the whole of empty space, just as there certainly is a boundary for a part of it, namely, the boundary of the bodies which that part includes, and, as I said, we can conceive the

surface of the outermost body as coinciding with the boundary of the whole of empty space. RRKS

Reading

Alan C. Bowen, R.B. Todd, *Cleomedes' Lectures on Astronomy: A Translation of The Heavens*, Berkeley 2004.

Edward Grant, *Much Ado About Nothing*, Cambridge 1981.

Richard Sorabji, *Matter, Space and Motion*, London & Ithaca, NY 1988, chs 8 and 9.

R.B. Todd, 'Infinite body and infinite void: Epicurean physics and Peripatetic polemic', *Liverpool Classical Monthly*, vol. 7, June 1982, 82-4.

R.B. Todd, 'Alexander of Aphrodisias and the case for the infinite universe (*Quaestiones* 3.12)', *Eranos* 82, 1984, 185-93.

R.B. Todd, translation of Cleomedes, forthcoming.

15. Extension

15(a) Five types in Simplicius

(1) Simplicius *in Phys.* 623,14-20

It looks as if extension (*diastêma*) is spoken of in four senses. [i] One kind consists merely in an unextended formula (*logos adiastatos*), as does the definition of extension. [ii] Another resides in thought about dimension (*epinoia diastaseôs*), as does mathematical extension. [iii] Another is enmattered and endowed with natural qualities and resistance, as is body. [iv] Another is enmattered, but altogether without qualities and incorporeal. [v] Different from these [extensions] again is material dimension (*hulikê diastasis*), which is conceived by reference to stretching and indefiniteness.

[vi] But neither is place an accident; it too [sc. like body which is in it] is substance, for it is not extension plain and simple (*diastasis haplôs*), but extended space (*diastôsa khôra*). RRKS

15(b) Spatial extension, corporeal extension

The extension of bodies is mobile like the bodies, the extension of space is immobile. Philoponus denies that the extension of space differs only in lacking qualities. The extension of bodies is *in itself* qualityless, but as will be seen under **18**, it involves matter and form.

(1) Philoponus *in Phys.* 577,10-16

It must be understood that the hypothesis put up by Themistius, on the ground that some say place-extension (*topikon diastêma*) is like body-extension (*diastêma sômatikon*) without qualities, is altogether far from the truth. For that extension is nothing but qualityless body. So for those who say this, the expected consequence will be other absurdities and especially that body passes through body. But we do not say that. For we do not say that the extension is body, but that it is space for body, and dimensions (*diastaseis*) alone, empty and apart from all substance and matter. DJF

15(c) On paratasis

See under **11(a)**.

Reading

Frans de Haas, *John Philoponus' New Definition of Prime Matter*, Leiden 1997, 172-80.
Philippe Hoffmann, 'Paratasis', *Revue des Études Greques* 96, 1983, 1-26.
Richard Sorabji, *Matter, Space and Motion*, London & Ithaca, NY 1988, chs 1, 3.

16. Vacuum

Vacuum (*to kenon*) is a space empty (*kenon*) of body. What that amounts to differs with different conceptions of body. Moreover, some thinkers have been interested only in the absence of a certain *kind* of body, e.g. air.

Aristotle's definition of place as a two-dimensional surrounding surface deliberately excludes three-dimensional space and three-dimensional empty space. See **13** above. But Aristotle is conscious that his predecessors, notably the atomists Leucippus and Democritus, who was followed by Metrodorus, had postulated vacuum as necessary to explain motion, growth, contraction and absorption, *Physics* 4.6, 213b2-30. Even Plato's theory of corpuscles in the *Timaeus* may commit itself to microscopic interstitial vacua in between the corpuscles, 58A4-5; 60E5, despite Plato's denial at 79B1 of a vacuum into which a body could move. Aristotle further reports, at *Physics* 4.9, 216b22-8, the idea that there must be vacuum, or when I boil a kettle, the universe would bulge, as the Pythagorean Xuthus said, or there would have to be a compensating contraction elsewhere.

Aristotle objects to vacuum that a cubic object already has its own volume (*onkos, sôma*), so that it is redundant to postulate also a three-dimensional space for it to fit into, *Physics* 4.8, 216b2-12.

(1) Aristotle *Physics* 4.8, 216b2-12

(i) But the cube has just the same magnitude (*megethos*) as the vacuum which it occupies and even if the magnitude is hot or cold or heavy or light, and is not separable from these qualities, none the less it is in its being different from all of them. I mean the volume (*onkos*) of the wooden cube. So if it were indeed separated from all the other things and were neither heavy nor light, it would occupy an equal portion of vacuum and would be in the same place as the part of space and of vacuum that is equal to itself. How then would the body (*sôma*) of the cube differ from the portion of vacuum and space that is equal to it? And if there were two such things in the same place, why should there not be any number? RRKS

The fullest set of objections, also in 4.8, protests that, so far from being needed for motion, vacuum would make motion impossible. Aristotle's denial of vacuum, like his definition of place, did not prove particularly persuasive. The arguments against motion in a vacuum were extensively answered by Stoics and by Epicurus and later by Philoponus, whose reply is praised by Galileo. Particularly important is Philoponus' *Corollary on Void* at *in Phys.* 675,12-695,8. See **22(d)**. Aristotle attacks separately the idea that since he considers the physical universe finite, he must allow vacuous space outside the universe. See above, **14**. It was not only the Stoics and Epicureans who reverted to postulating vacuum. Even the third head of the Aristotelian school, Strato, along with many Platonists, is said to have offered a qualified acceptance, according to which space could be vacuous so far as its own nature is concerned, even if other considerations rule that out. See **13(c)**. Strato

ap. Simplicium *in Phys.* 693,11-18 may further have postulated microscopic interstitial vacua, and Hero of Alexandria has a passage corresponding verbally to one of Strato's.

Reading

Pierre Duhem, *Le Système du Monde*, 10 vols, Paris 1913-1959, vol. 1, chs 4-5.

David Furley, 'Strato's theory of the void', in J. Wiesner, ed., *Aristoteles Werk und Wirkung*, Paul Moraux gewidmet, vol. 1, Berlin 1985, 595-609, repr. in his *Cosmic Problems*, Cambridge 1989.

Edward Grant, *Much Ado about Nothing*, Cambridge 1981.

Brad Inwood, 'The origin of Epicurus' concept of void', *Classical Philology* 76, 1981, 273-85.

Brad Inwood, 'Chrysippus on extension and the void', *Revue Internationale de Philosophie* 45, 1991, 245-66.

David Sedley, 'Two conceptions of vacuum', *Phronesis* 27, 1982, 175-93.

David Sedley, 'Philoponus' conception of space', in Richard Sorabji, ed., *Philoponus and the Rejection of Aristotelian Science*, London & Ithaca, NY 1987.

Richard Sorabji, *Matter, Space and Motion*, London & Ithaca, NY 1988, chs 8-9.

Robert B. Todd, 'Cleomedes and the Stoic concept of void', *Apeiron* 16, 1982, 352-66.

17. Prime Matter

17(a) Aristotle

Matter such as bronze is introduced by Aristotle *Phys.* 1,7-9 as the subject now of one set of properties, now of another when change occurs. But the ancient commentators do not doubt as some modern commentators do (see **17(i)** below) that Aristotle also believes in *prime* matter. They take it that prime matter is introduced in *Metaph.* 7.3, 1029a1-2 as a 'first subject' to which all properties, even length, breadth and depth, belong, while *in itself* it has no given quantity or quality. Hence the description of it in some commentators as a first subject, as incorporeal and as without quality, and perhaps Locke's idea that material substance is something, I know not what. This suggests to other commentators that it is a mere shadow, an interpretation repeated from Plotinus in Berkeley's *Siris*. Yet when Aristotle goes on to say that we see nothing left, unless there is something made definite by length, depth and breadth, this encourages yet another interpretation, rejected by Plotinus, but endorsed by Simplicius, according to which prime matter is three-dimensional extension (*diastêma, diastasis*) viewed separately from the determinate dimensions which give it a particular magnitude (*megethos*). A version of this idea is accepted at the sub-atomic level in modern physics, in its talk of physical matter as a field manifesting properties.

(1) Aristotle *Metaph.* 7.3, 1028b36-1029a2

The subject (*hupokeimenon*) is that of which everything else is predicated while it itself is not predicated of anything else. And that is why we must first determine its character, for the first subject (*to hupokeimenon prôton*) is most of all considered to be substance. RRKS

(2) Aristotle *Metaph.* 7.3, 1029a9-28

This is not sufficient, for it is itself unclear, and further it makes matter into substance, since if this is not substance, it escapes us what else is. For when everything else is stripped off, evidently nothing remains. For while the rest are active or passive qualities or capabilities of bodies (*sômata*), length, breadth and depth are quantities. They are not substances, for quantity is not substance; rather substance is that to which first of all these belong. But when length, breadth and depth are taken away, we see nothing left, unless there is something made definite (*horizomenon*) by these. So to those who look at it in this way, matter alone must seem to be substance.

[1029a20] By matter I mean that which is not *in itself* said to be a given anything, nor of a given quantity, nor characterised by any of the other categories which define being. For there is something of which each of

these is predicated, and its being is different from that of each of the predicates. For the rest are predicated of substance, and substance of matter, so that the last thing is in itself neither a given anything, nor of a given quantity, nor anything else. Nor is it the negations of these, for negations too will belong to it as accidental attributes.

[1029a26] So for those who think of things from this point of view, it turns out to be matter that is substance (*ousia*). But this is impossible, for separability and being a 'this' are thought to belong to substance most of all. RRKS

(3) Aristotle *Physics* 4.2, 209b6-11

Insofar as place is thought to be the extension (*diastêma*) of a magnitude (*megethos*), it is matter. For this [extension] is distinct from the magnitude, and is what is surrounded (*periekhesthai*) and made definite (*hôristhai*) by form, for example by a surface (*epipedon*) and contour (*peras*). And that is what matter and indefinite things are like. For when the contour and passive attributes (*pathê*) of a sphere are stripped off, nothing is left except (*para*) matter. RRKS

17(b) Alexander's conception

Alexander's conception, prime matter incorporeal and without quality:

(1) Alexander *DA* 3,21-4,4

Because there is a difference among natural bodies – for some of these are simple, while others are compound – the matter of compound bodies which underlies them is a natural body itself, constituted from matter and form (since every natural body is a compound of these), while simple bodies do not have a further compound underlying them (since then it [sc. the simple body] would also be a compound itself). Yet if what underlies them is not a compound, then it is not a body either, if at any rate every body is a compound of matter and form. What underlies simple bodies and is their matter, then, will be a kind of [4,1] nature that is simple and separate from form, since in respect of its own definition it is without shape, form, or configuration; and because this [nature] both is and is said to be without form, that which ends the privation just mentioned when it has come to be in it, is named form. It is this kind of nature that one would call matter in the principal sense. VC

17(c) Plotinus

Matter created by soul:

(1) Plotinus 3.9 [13] 3 (7-16)

So the partial soul is illuminated when it goes towards that which is prior

to it – for it encounters Being – but when it enters that which is posterior to it, it enters non-Being. This is what it does when it goes towards itself; for by directing its will (*boulesthai*) towards itself it creates what is posterior to itself, an image (*eidôlon*) of itself, the non-existent, as if it were walking in the void and becoming increasingly indeterminate; the indeterminate image of this is utter darkness, being entirely irrational and lacking in intellect, far away from being. As long as it occupies a mid-point, it is in its own domain; but when it has looked again at the image with a sort of second-best concentration (*prosbolê*), it shapes it and enters it with gladness. BF

Matter a shadow upon a shadow. Plotinus thinks of it as where creative light stops shining.

(2) Plotinus 6.3 [44] 8 (34-7)

But here what underlies does not generate, and is not adequate to be a being, because the others do not come from it, but it is a shadow, and a shadow upon a shadow, a picture and an appearance. RRKS

Plotinus rejects the rival conception that extension, rather than Alexander's prime matter without extension (an empty name), might be the constituent of body that receives qualities:

(3) Plotinus 2.4 [12] 11 (1-15)

'And why is anything else needed for the composition of bodies besides magnitude (*megethos*) and all qualities?'

There is need of something to receive them all.

'This, then is the volume (*onkos*). But if volume, then, presumably magnitude (*megethos*). But if it is without magnitude, it has nowhere to receive anything. And being without magnitude, what would it contribute, if it contributes neither to form and quality, nor to extension (*diastasis*) and magnitude, which, wherever it occurs, is thought to come to bodies from their matter. And in general, just as acting and producing and times and movements are things that exist without having a foundation of matter in them, so there is no need either for bodies, which come first, to have matter. They can each be what they are as wholes, and be more complex when their structure is produced by the mixture of a larger number of forms. So this "without magnitude" of matter is just an empty name.'

Now first, it is not necessary that what receives anything should be a volume, if extension is not yet present to it. RRKS

Matter is not body, *pace* the Stoics:

(4) Plotinus 6.1 [42] 26 (17-23)

How then is matter a principle if it is body? For a body is bound to be a

plurality; every body is a compound of matter and quality. But if it is body in a different sense, then [the Stoics] are saying that matter is body equivocally. If three-dimensionality is the common feature of all body, then they are talking about mathematical body. But if resistance is added to the three-dimensionality, then they are no longer talking about a single entity. Furthermore, resistance is a quality or is derivative of quality. BF

17(d) Porphyry

Bronze or Socrates can act as a subject of further properties, and hence as matter, but they are a *second* subject. The 'first subject' is qualityless matter.

(1) Simplicius *in Cat.* 48,11-33

Porphyry resolves this difficulty in the following way: 'There are,' he says, 'two kinds of subject, not only according to those from the Stoa, but also according to the more ancient philosophers. For unqualified matter, which Aristotle calls "body in potency", is the first meaning of "subject", and the second sense is that according to which there comes into existence either a common qualified or an individually qualified thing. For both bronze and Socrates are subjects for those things which come to inhere in them or are predicated of them.'

[48,16] 'Therefore,' he says, 'many of the things which inhere are in a subject with regard to the first subject, as all colour and all figure and all quality are in prime matter as their subject, not as parts of it but as incapable of existing without it. In the case of the second subject, however, not all colour or all quality is in a subject, but [they are so only] when they are not constitutive (*sumplêrôtikos*) of substance. For white in the case of wool is in a subject, but in the case of snow it is not in a subject, but constitutes the substance as a part, and is rather a subject in accordance with substance. Similarly, the heat is a part of the substance of fire, but it comes to be in iron as a subject, since it comes to be in and goes away from the iron without the iron being destroyed. Aristotle, however, here having taken the above-mentioned second subject – that which is in accordance with the composite and with individual substance, which he says neither is in a subject nor is said of any subject – rightly says that everything which is not said of it [48,30] substantially, but in terms of belonging accidentally, is in it as a subject, like heat in iron. Those things, however, which are constitutive like the heat of fire he would say was a part of the fire, but in qualityless matter as their subject.' MCh

17(e) Simplicius

According to Simplicius, Aristotle meant by prime matter indefinite extension, i.e. extension viewed separately from definite dimensions. The diffuseness of such extension suited it to play matter's role as the extreme opposite of the One.

(1) Simplicius *in Phys.* 537,9-19

Aristotle says that [*Phys.* 4.2, 209b6-11] if place is thought to be the extension (*diastêma*) of a magnitude (*megethos*), it will no longer be form, but matter. Now place is thought to be an extension which receives a magnitude. For a magnitude already endowed with form is said to be 'in a place'. In such a magnitude there is, firstly, an indefinite extension (*diastêma aoriston*) viewed in abstraction from, and as deprived of, a boundary or any other accidental property that it receives. Secondly there is a boundary and defining limit which makes the indefinite extension definite and embraces it, and this is the form, whereas what is left after that has been abstracted, is nothing else but matter or, equivalently (*t'auton de eipein*), extension. So if place is the extension of a magnitude, and the extension of a magnitude is matter, the conclusion is clear. RRKS

(2) Simplicius *in Phys.* 232,21-30

... even though the material extension (*hulikê diastasis*) remains the same for both of them. For [water and air] are both equally material, and equally divisible and perceptible, and undifferentiated in respect of their matter. For differentiae are studied in respect of forms. You can see from what is said in the fourth book of this work [i.e. the *Physics*] that Aristotle himself has the very same sort of idea as the Pythagoreans about the extension and indefinite quantity (*poson*) of matter. For he says there: [*Physics* 209b6-9, translated above under **17(a)**]. RRKS

(3) Simplicius *in Phys.* 229,5-7

And in the fourth book of this work he means the matter of a magnitude to be an indefinite extension (*aoristos diastasis*) which is made definite by the magnitude on the formal side. RRKS

(4) Simplicius *in Phys.* 230,17-21

What belongs in common to all natural, perceptible things as such must be matter. That is one of the most obvious facts, I think. And what is common is being spread into a volume (*onkos*) and extension (*diastasis*). And that is why, as Aristotle says [*Cael.* 1.1, 268a1], 'the science of nature is concerned with bodies, magnitudes and their properties.' RRKS

Simplicius reports, but rejects, arguments for the view that prime matter is qualityless body. At best, it is body only in a secondary sense, since body in the full sense has form and definiteness, whereas the extension which serves as matter is indefinite, *in Phys.* 227,23-228,20; cf. 232,7-13, translated under **23(c)**.

(5) Simplicius *in Phys.* 230,21-33

So perhaps two notions of body should be postulated, the first existing in terms of form (*eidos*) and formative principle (*logos*), and made definite (*horismenon*), by three dimensions (*diastaseis*), the second in terms of a slackening, a spreading and a lack of definiteness from the incorporeal, indivisible, intelligible reality. The second is not given a definite form by three dimensions, but is everywhere slackened, and spilt, and flows from all sides away from being into non-being. And perhaps we should postulate that *matter* is dimension (*diastasis*) of this sort. The corporeal *form* should not be so conceived. Rather, it gives measure and definiteness to the lack of limit and of definiteness of this sort of dimension and halts its flight away from being. For we must understand that matter ought to be what differentiates the enmattered from the matterless, and the enmattered differs in having volume (*onkos*), dimension (*diastasis*), divisibility and similar attributes. That is, not attributes of a definite, measured kind, but ones lacking measure or definiteness, and merely capable of being made definite by the measures which form contributes. RRKS

(6) Simplicius *in Phys.* 227,23-228,20

But since some people and not just anyone who is in philosophy – for instance the Stoics among the ancients, and Pericles of Lydia among the modern philosophers – say that the qualityless body is the first matter according to both Aristotle and Plato, it is probably a good idea to examine this doctrine.

[1] [227,26] For when first introducing matter by deriving it from change, Aristotle and Plato intend the qualities of the elements to be hot, cold, dry and fluid. Since these qualities have the body as their common substrate they change with respect to it, so that body will be prime matter.

[2] [227,30] Again, if there was another substrate underlying body because generations take place out of opposites, there would have to be an opposite of body, so that the contraries change with respect to the common substrate, [but there is none so body is the first substrate].

[3] [227,33] Again, we say that that which remains in every change is matter. Qualityless body remains, because there is nothing for the body to corrupt into.

[4] [228,1] It is clear that Plato also says that matter is the proximate substrate of the four qualities of the elements, i.e. qualityless body, from the following texts: [*Tim.* 52D] 'The nurse of becoming is made like water and fire and receives the forms of earth and air,' and [*Tim.* 53B] 'when he set to work at bringing order to the universe, by means of forms and numbers, he first shaped fire, water, earth, and air, having traces of themselves scattered around in a way one would expect everything to be when god is absent from it, being such by nature.' If the Demiurge put the

forms of the elements in matter first, and their common substrate is qualityless body, that must be matter.

[5] [228,10] According to Aristotle too qualityless body will appear to be the first substrate and matter. For if the body supervenes on matter like one of the other forms and disappears from it, it is clear that the privation of body, which is the incorporeal, would be present in matter before the body supervenes and after the body disappears, and there will be a natural substance which is incorporeal. This is not Aristotle's opinion because in many places he clearly says that natural things are bodies and connected with bodies.

[228,17] But it would be clear that Plato does not mean body to be the first subject, which we call matter, from his preferring his 'surfaces' as a kind of element of body, evidently as being more fundamental. FDH, RRKS

17(f) Is space matter, according to Plato?

Aristotle took Plato's 'receptacle' in *Timaeus* 48Eff. to represent an attempt to describe matter, and this view was accepted by Simplicius among many others. But it is not from this that Simplicius got his idea of prime matter as extension. For Simplicius, like Alexander, took Plato's identification [*Tim.* 52A] of the receptacle with space (*khôra*) to be metaphorical, *in Phys.* 540,15-541,29 below, whereas Aristotle and the Aristotelian Aspasius seem to have taken the identification of matter with space literally. Simplicius does transmit Porphyry's report of a Neopythagorean of the first century AD, Moderatus of Gadez (Cadiz). If 'citing these things' (*paratithemenos*) means that what follows is drawn by Porphyry from Moderatus, then Moderatus took Plato's space not as matter, but only as a model (*paradeigma*) for matter. But since the model was a quantity (*posotês*), Moderatus took it that he had Plato's authority for matter also being quantified (*poson*), though in an indefinite way. Simplicius himself, it was seen above under **13(h)**, assimilated place to form, not to matter.

(1) Aristotle *Phys.* 4.2, 209b11-13

For this reason Plato too, in the *Timaeus*, says that matter and space (*khôra*) are the same, for that which has the role of participant, and space, are one and the same. ARL

(2) Simplicius *in Phys.* 539,8-542,12

Having said that insofar as it is an attribute of place to be an extension (*diastêma*) we shall be led back to matter in our enquiry into the nature of place, he commented on Plato having called matter the space and place of embodied forms in the *Timaeus*. For in the *Timaeus* he says that matter is the receptacle of all becoming like a nurse. As he continues, he makes clearer the content of what he says. There is, perhaps, nothing against quoting more of what Plato had to say: [*Tim.* 51E-52D] 'These things being so, it must be agreed that one kind of being is the form that is always the same, having no beginning and indestructible, receiving into itself nothing

else from elsewhere, nor entering into anything else, invisible and in other ways imperceptible, the observation of which is assigned to intelligence. Second is that which is like-named and similar to it, perceptible, created, set in motion, continually coming into being in some place and again passing away from it, grasped by opinion with perception. Third there is the kind of being that is space which also is indestructible, providing a resting-place to everything that comes to be; it is grasped without perception by a bastard form of reasoning and is unreliable; we regard it in a dream and say that it is necessary for everything that is to be somewhere and occupy some place and that that which is neither on earth nor in the heavens is nothing. Of all these things, and those akin to them that surround the undreamed and true nature, we are unable to speak with accurate judgment and awake because of our dreamy state. For it is fitting that an image, since it does not own even that which comes from its prototype but is always the changing shadow of something else, should therefore come to be in something else, clinging to being in some way or other, or be nothing whatsoever. The true and accurate account that is a support of that which truly is holds that if two things are different then neither can come into the other and remain itself so that they are still two. So this account, worked out according to my judgement, is my concise offering, that being, becoming and space are three separate things, that precede the heavens.'

[540,2] Plato says these and similar things, and Aristotle here also looks to the apparent meaning of the text and says that Plato states that matter and space are the same thing, as do those who make extension (*diastêma*) their starting point. Among these things that he seems incidentally to blame Plato for, he did not blame him for calling place the matter of the forms. For he knew himself that one thing was referred to as the place that received the forms when he said in *On the Soul* [cf. 429a27] that 'those who say that the soul is the place of the forms speak well, save that the forms are there potentially and not in actuality', and something else was referred to as the place that receives body, which is what the present discussion is investigating. The only thing he says against Plato is this: If he says that place is matter, but the forms and numbers are also in matter according to him, since these also partake in matter, how can he say that the forms are not in a place? For that is why there is no place beyond the heavens, as he said [*Cael.* 1.9, 279a11-18] in the discussion of infinity. But perhaps even this is not a criticism of Plato, but he is pointing out to those who can understand that Plato did not say that matter was place in the sense in which 'place' is used in the present investigation. For he would not have denied that the forms and numbers were in a place, if he wanted matter to partake of them. That, then, is what Aristotle says.

[540,20] Alexander agrees also that matter is called space in the *Timaeus* with a different meaning, but he says that Aristotle finds fault with Plato with good reason. For even if someone says that he calls matter place metaphorically, anyone speaking metaphorically ought first to have it

established what place is in the basic sense. But if he is found nowhere else discussing place he seems to Alexander to be worthy of censure, because he treats place metaphorically without having first discussed place in the basic sense.

[540,27] But it is clear from the passage quoted from him above that Plato calls matter the place of forms and not of bodies. It is also clear from what has been said that such a usage is not simply metaphorical, but is taken according to some common significance of 'place' as that which is receptive, just as Aristotle also thinks it right to call the soul the place of forms. For if what partakes of something and is determined by it receives that of which it partakes, and if what receives and accommodates it becomes the space of what is in it, and if a space is thought of as place and if matter partakes of the forms, then place will be of the forms but not in the way that it is of bodies. The place of bodies is different. Here he treated what partakes as place.

[541,3] But Plato seems to know another significance of place more embracing than that as what determines proper ordering. Whether this comes about through position, as in the case of bodies, or through participation, as in the case of things potential and actual, or through mere determination of order, it seems to be place. That is why an order seems to be according to some position; for what is assigned to a certain order seems to be situated in it, and everything is situated in a place. In accordance with this general significance of place as what determines an order, Plato even speaks of a supracelestial place when he says in the *Phaedrus* [247C] 'But the supracelestial place no poet has ever sung worthily, nor will he ever.' So what is said about matter as being about place should be taken as of the place that partakes not of bodies but of forms.

[541,13] But I know that Plato never researched seriously into the nature of the place of bodies nor made his views public. For how could matter be the place of bodies, if bodies are composites, whether of matter and form or as form in matter? For in that case matter would be receptive not only of form but also of matter. In any case if a body moves from place to place, but does not move from matter, matter could not be place. Moreover we shall soon hear Aristotle destroying that hypothesis.

[541,20] It is clear that different things are referred to as place in Plato, one with reference to matter, another spoken of in the *Phaedrus* with reference to the intelligible, as is shown by the fact that place with reference to matter is receptive and determining and makes one with what is within it, which is clearly denied of intelligible things, to which he assigned the supracelestial place in the *Phaedrus*. For having spoken of matter as of place and space and receptacle and seat of the forms, in saying how it is known he calls it 'grasped without perception' and 'by a bastard form of reasoning and unreliable'; he adds that 'we dream as we regard it' and the rest of what was quoted a little earlier.

[541,30] But if Plato appears to have said nothing about place as that which receives bodies, why does Aristotle say that Plato alone had tried to

say what place is? Is it because Plato seems to say about that place which is matter regarded as place that it is a receptacle, that it is eternal, that it is the seat of forms in becoming, that it is grasped without perception, unreliably by a bastard form of reasoning and so on, and Aristotle says that he has spoken of place in so far as he has called matter place and space? But perhaps he was aware that he above all knew the depth of Plato's wisdom and that even if he did not seem to make a separate inquiry into place he was contemplating it as well as bodies, since place has its existence conjoined to bodies. For he speaks in the *Timaeus* [57C] about the power of place: 'Being affected in these ways everything changes its location. For the manifolds are sundered from each kind in their own place through the change of the receptacle that receives them, and some, becoming unlike themselves on each occasion and like to other things, are borne because of the shaking to the place of those things to which they have become like.' Aristotle says Plato spoke of matter in one way in the *Timaeus* and in another in his unwritten discussions. For in the *Timaeus* he calls it that which partakes (for it partakes 'at the furthest remove from the intelligible'), but in the unwritten discussions he called it the great and the small. JOU

(3) Moderatus of Gades (first-century Neopythagorean) in Porphyry *On Matter ap.* Simplicium *in Phys.* 231,5-21

And citing these things (*tauta paratithemenos*) from Moderatus, Porphyry, in the second book of his *On Matter*, has written that, 'As Plato somewhere says, the unitary reason (*logos*), desiring to construct the generation of beings from itself, by privation of itself made room for the quantity (*posotês*) of all things, having deprived it of its [i.e. reason's] rational principles (*logoi*) and forms (*eidê*). And this he called "shapeless quantity" and "undivided" and "without figure", but receptive of shape, figure, division, quality and everything of this sort. Of this quantity, he says, Plato seems to have predicated many names, calling it "all-receiving", and "formless", and "invisible", and "sharing in the intelligible in a most puzzling way", and "scarcely grasped by a bastard reasoning", and everything similar to these. This quantity, he says, and this form, the one conceived by privation of the unitary *reason* (which comprehends in itself all the rational principles of the things that are), are paradigms of the matter of bodies; and he said that the Pythagoreans and Plato called this too [i.e. the matter of bodies] "quantified" (*poson*) – not quantified as form, but as privation and undoing and slackening and dispersion and because of the deviation from being, for which reasons matter seems to be bad, as escaping the good. And it [i.e. matter, the quantified] is held down by it and not allowed to go outside the boundaries; and while the slackening is receptive of the rational principle of formal magnitude (*megethos*) and is determined by it, the dispersion is endowed with form by numerical distinctness.' RB

(4) Aspasius *ap.* Simplicium *in Phys.* 578,26-9

Perhaps Aspasius says better that he who introduces the likeness between matter and place must brush aside the fact that matter is in flux. For place is at rest and is changeless so long as it exists. JOU

Reading
Richard Sorabji, *Matter, Space and Motion*, London & Ithaca, NY 1988, ch 1.

17(g) Philoponus' earlier views

In Philoponus' earlier view, prime matter is first subject; prime matter with the three dimensions superimposed is second subject, and is corporeal extension. The three-dimensional is a quantity, but is an inseparable accident of substance. Damascius (see Cosmin Andron) had already provided a somewhat similar view, holding that qualityless body is the three-dimensional and is a second substrate, like some sort of matter, which is called second matter, as opposed to prime matter, Damascius *in Parm.* 1.26,19-20 Westerink-Combès, Damascius *On First Principles* 1.29, 3-9; 1.30, 9-10 Westerink-Combès.

(1) Philoponus *in Cat.* 83,13-19

In the nature of things quantity (*to poson*) occupies the second position. For, as has often been said, prime matter, which is without body, form or shape before being given volume (*exonkôtheisa*), receives the three dimensions and becomes three-dimensional. And so this, which Aristotle calls second subject (*deuteron hupokeimenon*), then receives qualities and constitutes the elements, so that quality has the third rank among the things that there are, and relatives the fourth. RRKS

(2) Philoponus *in Phys.* 578,32-579,8

Then it can be added that none of the categories exists without mutual interweaving. You cannot find one category existing without others being interwoven, not even substance itself which is said to be capable of existing on its very own. And matter and the second subject (*deuteron hupokeimenon*), I mean the three-dimensional (*to trikhêi diastaton*) and qualityless body, can exist on its own, so far as depends on it, but nonetheless it never does exist without qualities. And so, with spatial extension (*topikon diastêma*), even if it could exist on its own so far as depended on it (for what prevents a space (*khôra*) from being empty of body, as we said, if we think of a jar as containing no body within?), yet it never remains empty of body on its own. Rather it is like the case of matter in which, as one form perishes, another immediately supervenes. So too in this case, the substitution of bodies never leaves the space empty, but as one body departs, another falls into its place. And so one can never find even this sort of quantity devoid of substance, and perhaps the force (*bia*) of vacuum

consists in this sort of quantity never being separated from substance. This would preserve an idea which is expressed so continually that habit has made it into something that seems to be agreed: I mean the idea that quantity cannot exist on its own without substance. For a vacuum can never exist separated from body. RRKS

(3) Philoponus *in Phys.* 561,3-24

It has now been shown well enough that nothing absurd would follow even if it should happen, place being extended (*diastaton*) in three [dimensions], that multiple extensions (*diastêmata*), being bodiless, should exist in one place. For what is extended in three [dimensions] is not automatically a body; we shall not accept that this is a definition of body, since it is by virtue of being something else that body is extended in three [dimensions]. Body is a substance; quantity (*to poson*) is a property of substance, so three-dimensionality is a property of substance. But body is a substance, and hence being extended in three [dimensions] is a property of body. For it is body in that it is composed of matter and such-and-such a form, but because quantity is an inseparable property (*akhôriston sumbebêkos*) of body, therefore it is extended in three dimensions. He himself [Aristotle *Phys.* 1.2, 185a32-b3] said this clearly in his criticism of Melissus, and I will quote one passage from what he wrote there in support of my claim (though I could quote more) – as follows: 'Melissus says that what *is* is infinite. So what *is* is a quantity, since the infinite resides in quantity, and one cannot make a substance or quality or affection infinite, except accidentally in case they are quantities also at the same time. For the definition of infinite employs the term "quantity", but not "substance" or "quality".' In these words, then, Aristotle says clearly that quantity is a property of substance, and being extended in three [dimensions] is a property of substance. But body is a substance; so being extended in three [dimensions] is a property of body. Now if being extended in three [dimensions] is a property of body, then being extended in three [dimensions] is not the definition of body, but is an inseparable [reading *akhôriston*, as at 561,11] property. Hence, if something has three dimensions (*diastaseis*), it is not necessarily a body. DJF

Reading

Cosmin Andron, *Knowledge and Reality in Damascius*, PhD diss., University of London, in preparation.

17(h) Philoponus' later view

In Philoponus' later view, in opposition to, not as an interpretation of, Aristotle, the indefinite three-dimensional, which is qualityless body, replaces incorporeal matter as first subject and becomes prime matter. It is also the form of body, defining what body is, so is not an empty name. And it is a substantial quantity, so it falls under the category of substance. These views are very innovative: prime matter

becomes form. Substantial quantity is recognised alongside substantial quality, prime matter is extension and (like Stoic substance) is already body. Simplicius, as seen above under **17(e)**, agreed, and even ascribed to Aristotle the view that prime matter is extension, but denied that it was body, *in Phys.* 201,25; 228,17-230,33; 232,8-13, unless in a secondary sense, 230,21-7, translated above.

(1) Philoponus *contra Proclum* 405,23-7

That not all quality or quantity is an accidental attribute; there is substantial quantity (*ousiôdes poson*) and quality. And that the thing in bodies which is independent (*authupostaton*) [sc. of any substratum] and substance *tout court* (*haplôs ousia*) is the indefinite three-dimensional (*trikhêi diastaton*) which is the ultimate subject (*eskhaton hupokeimenon*) of everything. RRKS

(2) Philoponus *contra Proclum* 424,4-11

Just as there is such a thing as substantial quality which is referred not to the category of quality, but to the category of substance (*ousia*), as being a substantial (*ousiôdes*) differentia, so presumably there is also such a thing as substantial quantity (*poson ousiôdes*) and this precisely is the three-dimensional (*to trikhêi diastaton*). For the only thing found in bodies which is independent [sc. of any substratum] and is the actual substance (*ousia*) of body is a sort of three-dimensional volume (*onkos tis trikhêi diastatos*) indefinite as regards magnitude or smallness. RRKS

(3) Philoponus *contra Proclum* 424,23-425,14

Thus the substance of body is nothing other than the indefinite three-dimensional (*trikhêi diastaton*) which is made definite by the differentia of smallness and largeness, and which receives the differentiae which create the species of bodily substances. It produces the particular substances of bodies, I mean the substance of fire, of the sun, of the moon and of everything else. With this shown, it is clear that the three-dimensional is not an accidental quantity, for in that case it could come into, and go out of, existence without a body being destroyed. But as it is, we cannot even think of body without the three-dimensional. So it is the substance of body. If, then, the three-dimensional is actually the substance of body as such, and it alone remains unchanged amidst the changes in bodies, as has been shown, then there is no argument to show that incorporeal matter must underlie it as its subject. It itself is the first subject (*prôton hupokeimenon*) underlying all natural forms, and further, it is from it and from the substantial qualities in combination (*suntithemenon*) that there come into being the bodies which are made real, that is, fire, water and so on. RRKS

(4) Philoponus *contra Proclum* 428,7-10

[The three-dimensional (*trikhêi diastaton*)] is not a composite of an underlying subject and form, but is a simple volume (*onkos*), and has its being in this fact, and underlies all other things as their subject. RRKS

(5) Philoponus *contra Proclum* 428,14-25

If this is impossible, and it has been shown that nothing else underlies the three-dimensional (*trikhêi diastaton*) as its subject, but that it itself is the basis of everything, then it is clear that it is the simplest thing and the matter of all things, and is not a composite of anything else. Since this is so, and since the three-dimensional is independent [sc. of any substratum], and no change is found in it, there is no argument capable of establishing that an incorporeal matter underlies bodies as their subject. Natural things must be analysed into that on which they ultimately depend, whether one wants to call it the first subject (*hupokeimenon prôton*), or matter, for we will not dispute about names. RRKS

(6) Philoponus *contra Proclum* 440,6-8

Hence it is clear therefore that the first subject of all things and their matter is three-dimensional (*trikhêi diastaton*). RRKS

(7) Philoponus *contra Proclum* 413,24-414,5

So since the three-dimensional (*trikhêi diastaton*), i.e. the unqualified body, inasmuch as it is body, does not change, but every change of bodies occurs either with respect to its qualification or size or smallness, what necessity remains by which one might argue that the three-dimensional too must have something different which is incorporeal as its substrate instead of itself being the first substrate of everything and absolute matter, as also the Stoics rightly believed? FDH

(8) Philoponus *contra Proclum* 425,25-428,5

Perhaps someone might say in response that the first matter must be formless, but the three-dimensional (*trikhêi diastaton*) is not formless, if it is itself the form of body as such. So it will follow that the substrate of the [426,1] natural bodies is not formless but that a form will underlie forms. So if, they say, matter and the first substrate must be formless, the three-dimensional cannot be matter.

We could say in order to solve this problem, first that it is merely a claim, not a proof, that the first matter must be formless. For if it were impossible in general for something possessing a form to be the substrate for another form and to be its matter, it would be necessary to concede that the common

matter of all forms must be formless. But as it is, all natural and artificial generation takes not formless but formed matter for its own products. For instance, wood, which possesses form, becomes matter for building equipment, in the same way as bronze does for the bronze-smith's equipment. Also in the case of natural beings it is agreed that the unhomogeneous parts of the animal, viz. the body which is composed out of them, being something possessing form, are the matter for the vivifying powers of the soul. Moreover, the elements are the matter for that which is composed out of them; the humours which are their analogues are the matter of our bodies. Again, they themselves agree that the three-dimensional and qualityless body is, if not the first matter, then certainly the second substrate and the proximate matter for all natural forms. For the matter of something must not have any form of that of which it is the matter. For instance, the bronze does not have any form of those things which it receives in the definition of its essence, nor do the humours themselves, which are the matter of flesh, nerves, bones and the other parts of the animal, have any of those forms as constituents [427,1] of their own essence. In this sense one may call all matter formless in not having any of the forms it receives. However, it is not at all necessary for it to be devoid of form altogether if indeed all proximate matter down to and including the three-dimensional possesses a form.

Therefore the three-dimensional too, inasmuch as it is different from all forms which it underlies, can in this way be formless and the matter of everything. Certainly, it is not necessary that it is not first matter merely for the reason that it is a form. For no beings can be formless altogether. If in general such a thing is to belong to the things that are, it is necessary by all means that it has a certain natural principle of its existence, even if it were ineffable to us. For if it did not have any principle in virtue of which it exists and has being, it would not belong to the things that are. If so, then none of the things that are, are formless. For the natural principle in virtue of which each of them exists is the form and essence of each thing. Conversely, the form that is constitutive of each thing's essence is a certain natural principle in virtue of which it has being.

Therefore, if matter is not to be an empty name but an existing natural thing, it will of course have a principle in virtue of which it exists. Each thing's principle of existence is its form and essence. So also the principle of matter, in virtue of which it exists, is its form and essence. Hence, matter cannot be formless in all respects, for that would be equivalent to its not being at all, as we said. For that which has no principle of being [428,1] at all does not at all belong to the things that are. Therefore its possessing a form and not being formless will not prevent the three-dimensional from being prime matter. For the argument has proved the very opposite, viz. that nothing that is can be entirely formless in every way. FDH

Reading

Frans de Haas, *John Philoponus' New Definition of Prime Matter*, Leiden 1997.
Richard Sorabji, *Matter, Space and Motion*, London & Ithaca, NY 1988, chs 1, 2, 3.

17(i) Prime matter and four elements

Aristotle accepts the tradition that there are four basic elements, earth, air, fire and water, although he adds a fifth for the heavens. Each element is characterised by two of the four qualities, hot, cold, fluid and dry. Fire, for example, is hot and dry. Sometimes he views these qualities as more deserving of the name 'element', because they are simple, not composite. Eric Lewis has shown that in *Meteorology* 4, he treats the passive qualities, fluid and dry, as matter, e.g. 378b33-379a1, noted by Alexander *in Meteor.* 4, 182,5-8, while M.L. Gill has stressed that in *Parts of Animals* 2.1, 646a13-18, he treats all four qualities as the matter of composites. Lewis and Gill, like Charlton, deny that Aristotle invokes prime matter. But Emma Gannagé has argued that fluid and dry are being treated as the matter of homogeneous compound bodies like flesh, not as the matter of the four elements. And Alexander considers that the four qualities provide the form of the four elements, while their matter is prime matter. The idea of prime matter, on his view, is not abandoned.

Reading

William Charlton, *Aristotle's Physics: Books I and II*, in J.L. Ackrill ed., Clarendon Aristotle Series, Oxford 1970, appendix.

Emma Gannagé, *Alexander of Aphrodisias: On Aristotle On Coming to be and Perishing 2.2-5*, in the series *Ancient Commentators on Aristotle*, London & Ithaca, NY, forthcoming.

Emma Gannagé, *Le Commentaire d'Alexandre d'Aphrodise in de Generatione et Corruptione dans Gâbir Ibn Ḥayyân, Kitâb al-Taṣrîf*, PhD diss., Sorbonne, Paris 1998, vol. 1, 104-11.

Emma Gannagé, 'Alexandre d'Aphrodise *In De Generatione et Corruptione* apud Gâbir b. Ḥayyân, *K. al-Taṣrîf*', *Documenti e studi sulla tradizione filosofica medievale* 9, 1998, 35-86.

M.L. Gill, *Aristotle on Substance*, Princeton 1989.

Eric Lewis, *Alexander of Aphrodisias: On Meteorology 4*, London & Ithaca, NY 1996, Introduction.

18. Body

18(a) Stoics and Epicureans: body is resistant and three-dimensional

On the standard interpretation, body was defined by Stoics and Epicureans as resistant as well as three-dimensional. But the Stoics did not think this about all body, not, for example, about qualityless body (see below **18(c)**). Hence the hesitation in Plotinus' report on the Stoics at 6.1 [42] 26 (17-23). See also Lewis on 'God's body'.

(1) Plotinus 6.1 [42] 26 (17-23), translated above under **17(c)**

(2) 'Galen' *de Qualitatibus Incorporeis* 10 Kühn 19,483,13-14 (= *SVF* 2.381)

Why do they utter this definition only, as I said, of body, that it is what is three-dimensional (*trikhêi diastaton*) with resistance (*antitupia*)? RRKS

(3) Epicurus *ap.* Sextum *Math.* 1.21

If body is a bundled collection (*sunodos kata athroismon*) of extension, shape and resistance (*antitupia*), as Epicurus says, or the three-dimensional (*trikhêi diastaton*), i.e. what consists of length, breadth and depth, as the mathematicians say, or what is three-dimensional with resistance, as again Epicurus says, in order to distinguish it from vacuum, or a resistant volume (*onkos*), as others say .... RRKS

Reading
Eric Lewis, 'God's body: the Stoics on divine incorporeality', in preparation.

18(b) Aristotle: body is three-dimensional simply

In **18(e)** below, Philoponus objects to Aristotle's argument that, if there were vacuum, it would not differ from a body's extension. But since Aristotle rejected vacuum as impossible, he did not feel the need to specify that body requires resistance. He was also willing to speak of geometrical solids as body.

(1) Aristotle *Cael.* 1.1, 268a7-8; 268b6

For of things constituted by nature some are bodies and magnitudes, some possess body and magnitude, and some are principles of things which possess these. Now a continuum is that which is divisible into parts always

capable of subdivision, and a body is that which is in every way [i.e. dimension] divisible.

Now bodies which are classed as parts of the whole are each complete according to our formula, since each possesses every dimension. RRKS

(2) Aristotle *Metaph.* 5.6, 1016b28

Now that which is indivisible in quantity is called a unity if it is not divisible in any dimension and is without position, a point if it is not divisible in any dimension, and has position, a line if it is divisible in one dimension, a plane if in two, a body if divisible in quantity in all – i.e. in three – dimensions. RRKS

18(c) Stoics and Philoponus' later view: qualityless body is three-dimensional simply

Philoponus appeals to the Stoics, at *contra Proclum* 413,24-414,5, translated under **17(h)**, for his thesis that prime matter is qualityless body, defined as three-dimensional simply. For the Stoic position, see:

(1) Simplicius *in Phys.* 227,23-6 (= *SVF* 2.326), translated under **17(e)**

(2) Plotinus 2.4 [12] 1 (13-14) (= *SVF* 2.320)

And they [the Stoics] grant body to [matter], calling it qualityless body and a magnitude (*megethos*). RRKS

(3) Sextus *Math.* 10.312 (= *SVF* 2.309)

The Stoics made everything come to be out of a single qualityless body, because matter that is qualityless and capable of passing through every state is, according to them, the origin of beings. As this matter changes, the four elements come into being, fire, air, water and earth. RRKS

18(d) Simplicius: body has form as well as matter

Simplicius: body in the full sense has form and definite dimensions, as well as indefinite extension, which is its matter. But see **20(d), (e)** for immaterial or less material bodies accepted by Simplicius *in Phys.* 531,3-9; 616,23-617,2; 643,16-26; 916,5-12.

(1) Simplicius *in Phys.* 230,21-33, translated under **17(e)**

18(e) Philoponus: unlike space, body has matter

Body is unlike space, because it has matter and form. Philoponus' earlier view: three-dimensionality is merely an inseparable accident of body and not sufficient

for body. For body, unlike space, requires matter and form. On Philoponus' later view, however, this rationale is missing, since it is indefinite three-dimensionality that serves as both matter and form to body (see **17(h)**).

(1) Philoponus *in Phys.* 561,3-24, translated under **17(g)**

(2) Philoponus *in Phys.* 577,10-16, translated under **15(b)**

(3) Philoponus *in Phys.* 687,31-5

Secondly, he [Aristotle *Phys.* 4.8, 216b2-12, translated under **16**, speaking of the body (*sôma*), i.e. volume, of a tube as no different from the vacuous space which his opponents think it can enter] is wrong to identify the void with body. For if you remove every quality from the body, even then the bodily extension (*diastêma*) is not the same as the void. For even if we take away every quality from the body, there will still remain the matter as volume (*onkôtheisa*) and the qualityless body, which is composed of matter and form in the category of quantity; but the void is not composed of matter and form. For it is not a body at all, but bodiless and immaterial (*aülon*) – space without body. DJF

18(f) Body defined as bounded in Aristotle

So Aristotle, who may (but see Todd) be followed by the Stoic Cleomedes.

(1) Aristotle *Phys.* 3.5, 204b5-7

For if the definition of body is [that it is] that which is bounded (*hôrismenon*) by a surface, there could not be an infinite body, either intelligible or perceptible. ARL

(2) Cleomedes *de Motu circulari* 1.1.104-9 Todd

It is also simple-minded of them [i.e. the Aristotelians] to say that, if there is void outside the cosmos, it will have to be infinite, and that if the void outside the cosmos is infinite, there will have to be infinite body. For it does not follow from the infinity of the void that body is infinite too. For one's thought of the void does not give out anywhere, whereas in the conception [reading: *ennoia*] of body, being limited (*to peperasmenon*) is immediately included. RRKS

Reading
Richard Sorabji, *Matter, Space and Motion*, London & Ithaca, NY 1988, 140.
Robert B. Todd, 'Cleomedes and the Stoic concept of void', *Apeiron* 16, 1982, 129-36.

18(g) Perceptible substance in Plotinus

Perceptible substance as a conglomeration (*sumphorêsis*) of qualities and matter:

this is what perceptible substance amounts to on an Aristotelian view, according to Plotinus. The word *sumphorêsis* comes from Plato *Phaedrus* 253E; *Philebus* 64E; *Laws* 693A and is found also in Dexippus *in Cat.* 58,23-59,7; Simplicius *in Cat.* 115,25-31.

(1) Plotinus 6.3 [44] 8 (19-37)

But then is perceptible substance some conglomeration (*sumphorêsis*) of qualities and matter? And are all these substance, when they are fixed together upon a single matter? But when each is taken separately, will one be quality and another quantity? Or will they be many qualities? And is that whose absence does not allow being to be completed a *part* of this substance, whereas what supervenes on a substance when it has come into being has its own position and is not hidden in the mixture that makes the so-called substance? I do not mean that when it is there with the others it is substance, completing a single volume of such a such a size and kind, but that elsewhere when it is not completing anything, it is a quality. I mean that not even in the former case is any of them a substance, but the whole composed of all of them is a substance. There should be no objection, if we make perceptible substance out of non-substances. For not even the whole is true substance; it imitates it, for true substance has being independently of the others which accompany it and the others which are generated out of it, because it truly is. But here what underlies does not generate, and is not adequate to be a being, because the others do not come from it, but it is a shadow, and a shadow upon a shadow, a picture and an appearance. RRKS

18(h) Body as bundle of God's ideas in Gregory of Nyssa

See under **7(a)**

18(i) Corporeality as a form in Plotinus

(1) Plotinus 2.7 [37] 3

Since we mentioned corporeality, we should consider whether it is the combination of all the different constituents, or a form, and a formative principle which creates body by its occurrence in matter. So if body is the combination of all the qualities with matter, this is just what corporeality is. If it is a forming principle that creates the body by its approach, then clearly the forming principle contains all the qualities by embracing them. If this forming principle is not just another name for a definition which declares what the entity is, but a principle that creates the entity, then it must not include the matter but must be a principle which is associated with the matter and which by its occurrence brings the body to completion; the body will then be comprised of matter and the reason principle residing in it; but we should consider the reason principle itself as a form, stripped

of all matter, even if it is in itself utterly inseparable from matter. For the separable principle, to be found in Intellect, is something else; it is in Intellect because it is itself Intellect. BF

Reading

Ricardo Chiaradonna, '*Ousia ex ouk ousiôn*, Forma e sostanza sensibile in Plotino (*Enn.* VI 3 [44] 4-8)', *Documenti e studi sulla tradizione filosofica medievale* 10, 1999, 25-57.

Frans de Haas, *John Philoponus' New Definition of Prime Matter*, Leiden 1997, ch. 4.

Eric Lewis, 'God's body: the Stoics on divine corporeality', in preparation.

Jaap Mansfeld, 'Zeno of Citium', *Mnemosyne* 31, 1978, 134-78 at 158-67.

Richard Sorabji, *Matter, Space and Motion*, London & Ithaca, NY 1988, chs 1-6.

19. Light

19(a) Plato vs. Aristotle

In antiquity, as nowadays, it was an issue whether light was a body, or not a body. Plato had made light a kind of fire (*Timaeus* 45B2-D3, 58C5-6), Aristotle something incorporeal, viz. the state of a transparent medium in which it can actually be seen through (*DA* 2.7, 418b9; 419a11). and equally the presence of fire, or what is like fire, in a transparent medium (*DA* 2.7, 418b16 and 20; *Sens.* 439a20). If light is a mere state or presence, it is hard to account for its going in straight lines, as geometrical optics requires (Richard Sorabji, 'Colour, light and imperceptibles', *Bulletin of the Institute of Classical Studies*, 2004). Yet, if it is a body, why does it penetrate other bodies instead of colliding with them?

(1) Plato *Timaeus* 45B2-D3

Tim: First of the sense organs they constructed the eyes to be bearers of light, and inserted them according to the following principle. The kind of fire that was not able to burn, but provided a gentle light, they formed into a body proper to each day. For they made the pure fire within us that is akin to that light flow through the eyes as a smooth and dense stream, and compressed the whole eye but especially its centre, so that it could keep out everything that was too coarse, and allow only what was of this pure quality to pass through. So whenever there is daylight around the stream of sight, then like falls upon like, becomes compacted, and a single kindred body is formed along a straight path from the eyes, wherever the light from within falls upon and meets the resistance of whatever external objects it has come in contact with. The whole stream then becomes affected in a like manner, since it is all alike, and spreads the motions of whatever it touches, or whatever touches it, along the whole body into the soul, and thus provides that sensation by which we say that we see. RW

(2) Plato *Timaeus* 58C5-7

Next one should consider that many types of fire have been created, such as flame, and that which issues from flame but instead of burning gives light to the eyes. RW

(3) Aristotle *DA* 2.7, 418b9; 419a11

The actualised state (*energeia*, *entelekheia*) of the transparent *qua* transparent is light. RRKS

(4) Aristotle *DA* 2.7, 418b16 and 20

[Light is] the presence of fire or something similar in the transparent. RRKS

(5) Aristotle *Sens.* 3, 439a20

Whenever there is something like fire in the transparent, its presence is light and its absence darkness. RRKS

19(b) Light corporeal or incorporeal?

The disagreement between Plato and Aristotle on whether light is corporeal or incorporeal created a problem for commentators who wanted them to agree. Alexander, representing Aristotle's school, and, among the Neoplatonists, Plotinus, Philoponus, Priscian and 'Simplicius' *in DA*, whom Carlos Steel identifies with Priscian, seem to treat light as incorporeal. At the opposite extreme stands Proclus, according to whom even the supracelestial light which constitutes space is a body, though a body visible not to the eyes but only through the luminous vehicle of our rational soul (*in Remp.* 2.195,9-14; 196,20; 199,21). Moreover, it is an immaterial body (*aülos*). 'Immaterial' does not mean lacking prime matter, but less gross (*pakhumeres*), as shown e.g. by the recognition of degrees of immateriality at *in Tim.* 2.9,12-13; 2.10,3-7, translated below (see also under **13**). Sunlight is also a body, but to some extent immaterial. Firelight is a material body, and passes through other bodies only by going through the pores in them (see also under **20**).

Syrianus, Proclus' teacher, partly foreshadows Proclus' ideas, considering light immaterial, but seeming to leave it open whether, like the vehicles of our souls, it is an immaterial body, *in Metaph.* 85,22-8.

Iamblichus is said by Priscian to think light incorporeal (though Priscian is wrong that Aristotle's Peripatos would disagree, unless he is referring simply to Strato – see frs 65a; 66 Wehrli), and Iamblichus' follower, the Emperor Julian, makes light incorporeal. So Iamblichus might seem to be on the other side from Proclus, but there are qualifications. For Julian connects sunlight with Aristotle's fifth element, which is a body. 'Simplicius' *in DA* 133,30-5, further cites Iamblichus as commenting on Plato's compacting daylight with the stream of sight into a single body (*sôma*) and saying in what way (*hopôs*) this is so. In *On the Mysteries of the Egyptians*, Iamblichus associates superhuman beings with light or fire, according to their rank in the celestial hierarchy. Finamore has accordingly suggested that Iamblichus may regard lower kinds of light as corporeal fire.

The genuine Simplicius is different from 'Simplicius'. He reports Plato and others as making light a body, without expressing dissent, *in Cael.* 85,7-9; *in Phys.* 966,5-12; 615,27-30.

Reading

John Finamore, 'Iamblichus on light and the transparent', in H.J. Blumenthal and E.G. Clark, eds, *The Divine Iamblichus*, Bristol 1993.

Richard Sorabji, 'John Philoponus', in Sorabji, ed., *Philoponus and the Rejection of Aristotelian Science*, London & Ithaca, NY 1987, at pp. 26-30.

Richard Sorabji, *Matter, Space and Motion*, London & Ithaca, NY 1988, 109-19 (on supracelestial light).

19. Light

I will start with those commentators who make more concessions to corporeality and then move to the incorporealists. Proclus regards light as a body, although in varying degrees 'immaterial'; and before him Syrianus reports this view favourably.

(1) Syrianus *in Metaph.* 85,15-28

But the reason for which this whole discussion was set going is that neither these men, nor those who hold that simple immaterial (*aüla*) bodies pass through each other without dividing each other, take it to be impossible for a couple of three-dimensional solids (*sterea sômata*) to come together. What they say is that it is absolutely impossible for two material (*enula*) and resistant (*antitupa*) bodies to occupy the same place, but that immaterial bodies resemble the light emitted from different lamps which goes right through the whole of the same building, the light of each lamp passing through that of the other without being fused (*asunkhutos*) or divided. Even if someone wants to call the light incorporeal, it still has the same extension (*sundiastanta*) as bodies and stretches with them over the three dimensions (*diastaseis*), and nothing prevents the light of each lamp occupying the same place as that of every other and of the various bodies. The reason is none other than that the light of each lamp is simple and immaterial and is not divided or parted, but is united with its source and so attached to it that it exists when the source is shining, and departs when the source leaves. In fact, nothing prevents the immaterial bodies attached to our souls from doing the same. RRKS

(2) Proclus *in Tim.* 2.8,20-7

Hence you could gather that all bodies participate in fire, but the fire is different for different things. For light (*phôs*) is not the same thing as flame (*phlox*), nor flame as embers (*anthrax*), but there is a scaling-down (*huphesis*) of fire between heaven and earth, proceeding from the more immaterial (*aülotera*), pure and non-bodily to the most material (*enulotata*) and densest (*pakhutata*) bodies. HT

(3) Proclus *in Tim.* 2.43,29-2,44,24

One should consider that the fire there [in the heaven] likewise is not like our fire beneath the moon, but that it is divine fire, woven together with life and imitating intellective fire, whereas ours is in fact material (*enulon*), generated, and destructible. So the pure fire is in the heaven, and that is where fire as a whole is, but earth is present there in a causal way (*kat' aitian*), being another kind of earth, such as would be expected if it unites with the divine fire. It has solidity (*to stereon*) alone, just as the fire has luminosity, and just as that is not given to burning, so neither is the earth there something thick – of each there is the highest kind. And just as the pure fire – what really is fire – is there, so too what really is earth and the

fullness of earth is here; and fire is here by participation and in a material way (*hulikôs*), much as the earth is there in a causal way. The other is present in each of the two in an appropriate fashion, in one place the pinnacle of earth, in the other the dregs (*hupostathmê*), [Plato *Phaedo* 109C] of fire.

[44,10] The moon also is an indication, having a solid (*stereon*) and dark quality, and blocking out the light (for it is only in earth's nature to block out), and the stars which stand in the way of our attempts to see beyond, as if making a shadow above themselves. And it is clear that as these two are there on high, fire and earth, what are intermediate between them must also be there, transparent things to start with, air like the brightest here, and water like the lightest of vapours or something still purer than these, so that all things should be in all, and each in an appropriate fashion. For it is on account of this that we characterise fire by its visible quality, which is peculiar to all fire, and reasonably so: for just as earth is first and foremost tangible, so is fire [first and foremost] visible, because it needs none of the other elements in order to be seen (as the others need fire to be illuminating them so as to be seen), but it comes to be visible in and of itself, and this is the universal property of all fire. So the problem under investigation is solved. HT

Light from fire is a material body according to Proclus.

(4) Proclus *On Light ap.* Philoponum *contra Proclum* 18,16-19,12

That the light in the air is perishable and numerically different in each case is confirmed by the evidence itself and Proclus also taught it clearly in his treatise on light. He says what follows: 'If some light is material (*enulon*) and some immaterial (*aülon*), according to the difference of the illuminating things, fire and sun, then how is it that the immaterial light perishes and the material somehow passes through material objects? For the air as a whole does not appear to us to be more illuminated by the sun than by firelight down here. And indeed if a cloud runs under the sun, light on the under side of the cloud is cut off and does not exist at all.'

These are Proclus' words. Notice, however, that he put it not as a question that the light perishes, but as something agreed, and on the basis of this he raises the question how, if the light from the sun is immaterial, it perishes and, if a cloud runs under the sun, it does not exist at all on the under side. Again, he says a bit later what follows: 'For how could the light in the heavens be continuous with the light in the air? For the one is perishable, but the other is not, and the one depends on its own source, but the other may happen to be cut off and sometimes does not exist; but the imperishable is not continuous with the perishable. For things of these kinds are two and different in species'. Therefore, Proclus, too, taught clearly that the light in the air is perishable. PL

Light in the heavens, though a body, is relatively 'immaterial' for Proclus.

(5) Proclus *in Tim.* 2.9,8-18

But perhaps that remarkable man Aristotle will challenge our account, claiming that not all that is visible is such by its participation in fire – that at least the troupe of the stars and the great sun itself are still visible even though they don't partake of fire. And if someone were to say to him that material (*enulon*) fire is one thing, while immaterial (*aülon*) [fire] is another (meaning that it is immaterial as compared with the matter of things beneath the moon), and the perishable [fire] is one thing and the imperishable [fire] is another, and that [fire] which is mixed with air is one thing and what is pure is another, and in general that there are many species of fire, perhaps he will concede the argument and listen to the theologians who call the sun a 'reservoir of fire', or a 'dispenser of fire', and all that sort of name. HT

(6) Proclus *in Tim.* 2.10,3-7

As I said before, I say 'immaterial' (*aülon*) and 'material' (*enulon*) defining them in relation to the grossest matter which does not conserve forms, and distinguishing the matter which remains always the same in its own proper form. RRKS

Julian, reflecting Iamblichus, calls light incorporeal but nonetheless makes sunlight to consist of Aristotle's fifth element.

(7) Julian *to King Helios* 5, 132c5-6, 103,8-10 Lacombrade

[The universe has existed and will exist for ever] protected by nothing other than, continuously, the fifth body, of which the 'radiance of the sun' is the head .... GC

(8) Julian *to King Helios* 7, 133d1-3, 105,2-4 Lacombrade

Is not light itself the incorporeal, divine form of that which is actually (*kat' energeian*) transparent? GC

(9) Julian *to King Helios* 7, 134a3-6, 105,12-15 Lacombrade

Light is the form of this quasi-matter which is diffused among bodies. Light itself is incorporeal, and radiance is its perfection and flowering. GC

(10) Julian *to King Helios* 7, 134b1-4, 105,18-21 Lacombrade

Nor does our account disagree, if light itself is incorporeal, if one should

suppose not even its source to be a body, but the undefiled activity of intellect shining onto its own abode. RRKS

Iamblichus' own ambiguous view has been described above. He includes various kinds of fire among the kinds of light in *Myst.*, and Simplicius reports him as interpreting Plato's apparently corporealist view. But Priscian treats Iamblichus as an incorporealist.

(11) Iamblichus *Myst.* 2.4, 77,10-18 Des Places

Similarly, then, with light. The images of the gods flash an excess of light, those of the archangels are full of supernatural (*huperphuês*) light, and those of the angels shine with light. But the daemons display a murky fire, the heroes one mixed from many ingredients. Of the archons, the cosmic ones show a purer fire, but the material (*hulês*) ones show a fire mixed from dissimilar and opposite ingredients. As for souls, they make the fire conspicuous in part, as being filled with many ingredients from the world of coming into being. RRKS

(12) 'Simplicius' *in DA* 133,30-5

'For it [light] is neither fire nor in general body' [Aristotle *DA* 418b14]. He [Aristotle] adds this not about the transparent but about light and he is aiming at the *Timaeus*. In what way (*hopôs*) in this text light is said to be a form of fire and in what way daylight and the flow from sight become compacted to form a single body, that can be gathered from the commentary of Iamblichus on the *Timaeus*. CS

(13) Priscian *Metaphrasis in Theophrastum* 9,7-25

First therefore I want to make this distinction, that the caused light is one thing, and its cause another, such as that in the sun or in fire; and the argument in the enquiry about what light is is not about the cause, but about that which goes out from it, which is what is said to be the actualisation of the transparent which is in air and water and in those things which receive light and darkness in turn. And then, following Iamblichus, I want this to be neither body, like the Peripatetics [Strato?], nor indeed an effect (*pathos*) or quality of any kind of body; for it is not in the air that light has its being: at any rate when that [the air] is moving it [light] stands still [cf. Plotinus 4.3 [27] 22 (1-9), translated under **Psychology 6(b)**], and when that is turning in many ways, it is isolated separately and preserves its undivided continuity with its cause. But also the immediate presence of it over everything that is capable of receiving it, when that which gives light is present, and again its immediate cessation when it has gone away, leaving behind no trace of itself, is a sign that light is not a thing (*pathêma*) that air undergoes. For the affections (*pathê*) it does undergo, like heat, do

not occur in it immediately, and when fire has gone away it [the fire] leaves behind some faint form of itself in the thing it has affected. And the facts that it [light] does not occur by transmission nor by change, and that it is not confined within a certain compass, but goes on to everything that is capable of receiving it, and that lights do not combine with one another, all these show that the activity of light is separate from bodies. PH

'Simplicius' also reports, *in DA* 134,5-20, with dissent, Proclus' corporealist treatment of light in the air, whereas Simplicius reports without demur, *in Cael.* 85,7-9, the apparently corporealist views of Plato and (*in Phys.* 966,5-12) of those who believe that light is a body. In his *Corollary on Place* at *in Phys.* 615,27-616,13, Simplicius criticises Proclus' identification of place with the special kind of light described in Plato *Republic* 10, in the Myth of Er. Simplicius accepts that the Chaldaean Oracles give the name 'light' to something special, perhaps beyond the empyrean firmament. But he insists that since light is a species of fire in Plato's *Timaeus*, it cannot be superior to fire.

(14) 'Simplicius' *in DA* 134,5-20

'For two bodies cannot be together in the same place' [Aristotle *DA* 418b18]. Material (*enula*) bodies, without a doubt. How then is the fiery light in the air? For they will not go in little pieces through each other's pores, as Proclus supposes, both because the whole air is seen to be wholly illuminated throughout itself and because the continuity of the light with its cause would not be preserved and because the illuminating source would not be active through all of its parts, being impeded by what resisted it, nor would the whole of its surface be seen by us all at once when also the rays from our eyes, as they say, pass through the pores of the transparent. And what would be the natural motion of light? For being a body it will have one. Not a circular motion! It seems that a motion in a straight line would suit it best. But yet it cannot be [a motion] in a straight line, for up and down are opposites and not both together. But light travels equally up and down and sideways. And how could there be some motion taking no time? For it would be faster than that of the whole heaven, which revolves the sixth part in four hours, but the starlight comes as soon as they rise, imperceptibly, as they themselves would say, since it is in reality all at once everywhere. CS

(15) Simplicius *in Cael.* 85,7-9

Plato says that the heaven is made up mostly of fire (*ek pleistou puros*), because since, according to him, there are three kinds of fire – burning embers (*anthrax*), flame (*phlox*) and light (*phôs*) – they are principally (*malista*) made up of the purest (*katharôtatou*) and most luminous (*phôteinotatou*) of these kinds of fire, that is, of light. Ph Hof

(16) Simplicius *in Phys.* 966,5-12, translated under **Psychology 8(d)**

(17) Simplicius *in Phys.* 615,27-30

And yet, if light is a species of fire, as we have learnt in [Plato's] *Timaeus*, and the species could not be superior to the genus, light would not, so far as this goes, be superior to fire. RRKS

For Plotinus, light is incorporeal, 4.5 [29] 7 (33-49), except that we should distinguish the sun as a corporeal light from the incorporeal light that shines from it. Priscian (*Metaphrasis* 9,7-25 translated above) makes the same distinction.

(18) Plotinus 2.1 [40] 7 (19-28)

Plato himself bears witness to this when he says: 'God kindled a light at the second circuit from the earth'. He meant the sun, which he elsewhere calls the brightest as well as the clearest, deterring us from thinking of it as anything other than fire – but neither of the other sorts of fire, but light, which he says is different from flame and merely agreeably warm. This light is body, but another light, bearing the same name but not the same nature, shines out from it, which we say is incorporeal. BF

For other commentators, both Peripatetic and Neoplatonist, light is incorporeal. So Alexander, Priscian (*Metaphrasis* 9,7-25), the possibly identical 'Simplicius' (*in DA* 131,38-132,3; as above *in DA* 34,5-20), and Philoponus.

(19) Alexander *in Sens.* ad loc., 31,9-18, translated under **19(d)**

(20) 'Simplicius' *in DA* 131,38-132,3

We reason that it is incorporeal and that it is not an affection but actuality: the former since we see it penetrating throughout the transparent, the latter because of its appearance and disappearance which take no time. For affections come to be and cease in time, and bodies, at least material bodies, do not pass through each other. CS

(21) Philoponus *in DA* 326,39-329,2

That light too is no body, is clear from what follows. If it were a body, how, I repeat, could the motion of a body be so instantaneous (*athroon*)? As soon as the sun rises above the horizon, suddenly, and in no time, the whole hemisphere above the earth is illuminated. Also, if I shaded a lamp and introduced it into a chamber, and then removed the shade, instantly (*athroon*) the whole chamber would be illuminated. So how can a body travel like this in no time?

[327,6] Again, if light is a body, clearly, as it is simple, so will its movement be simple. There are two simple motions, rectilinear and circular. If light's motion is rectilinear, it will either travel upwards and so not

downwards or downwards and so not upwards. In fact, however, light is observed to move simultaneously both up and down and right and left. Yet all bodies with rectilinear motion move either exclusively up or exclusively down. On the other hand, it is evident from experience that the motion of light is not circular. For if I introduce a lamp to a narrow oblong chamber, it would at the start illuminate the whole chamber rectilinearly at once, and would illuminate the upper part if placed below and the lower if placed above.

[327,15] The rectilinear and non-circular motion of light is also clearly shown by optical research. Thus if you make a bore-hole or incision in a plank of wood and set a lamp on one side near the incision and a second plank on the other side, then the light that passes through the incision from the lamp will appear on the second plank. So if, from the light arising on the second plank, a straight line is drawn, it would pass through the incision to the lamp, so that it is obvious that the motion of light is rectilinear. If, then, its motion is not rectilinear, like that of bodies, exclusively either up or down, nor circular, and if all bodies have one of these two motions, then it would appear that light is not a body.

[327,25] Again, if light is a body, there is no avoiding one body being in another, if it passes through the whole of the air. If, however, it does not pass through the whole of the air, but either cuts through it or passes through its pores, of necessity, there is not light in every part of air, but there are some illuminated and some darkened parts, so that not all the air is illuminated.

[327,30] Moreover, the air will not be ubiquitous, but where there was light there would not be air and where there was air there would not be light. As a result, we would turn out to breathe both light and air and sometimes light only and not air, when our respiration was occurring in the illuminated area! All this is patently absurd and wildly contrary to experience.

[327,34] Moreover, when the wind moves as a continuum all at once, it should either wholly darken the area on which it falls or make it darker by pushing out the body of light or parts of it and coming to be in their place. This does not, of course, actually happen. Rather, we see that even when the air is illuminated, the same activities of the air occur; respiration cools us in just the same way, although it is the nature of light to warm even the air itself, not to cool it.

[328,3] In addition, since those who say that light is a body say that a sphere of light proceeds from the sun, since the sun too is spherical and the air is spherical as well, the sphere of light proceeding towards us must either push the sphere of air and thus by replacing it illuminate our locality, or not expel it but pass right through it. If it pushes the air, and replaces it, then the illuminated hemisphere will be empty of air, which is impossible, since, as I said, all the functions of air occur even when our whole locality is illuminated. If it does not push, on the other hand, it will not illuminate either since it will not reach us. If, however, the light passes

right through the air, then there will be a passage of body through body, which is impossible.

[328,13] If they are going to say that it can pass through body because it is *immaterial* (*aülon*), the argument is especially impossible. For in that case, the heaven should be able to be compressed to a grain [see **20(d)**].

[328,15] Next, if its immateriality allows it to pass right through a body, then it would pass not only through air but through anything else whatever. For what lottery would prevent it going through everything if *qua* immaterial a body can pass through body? Thus light would have to pass even through solid bodies, that is through earth and similar ones. Why, then, do we not see above the earth even when the sun is below it, if light even passes through the earth?

[328,21] Next, if light as body passes through the air as body, then the combined totality should become thicker and denser. In fact, on the contrary, the air becomes rarefied on the reception of light, which would not be the case if it were a body. Just as, if water were to be passed through earth and the combined space did not increase, then it would be necessary that the combined body should have become denser, so it would be necessary for the air to become denser with the entry of light. In fact, on the contrary, illuminated air is rarefied.

[328,27] If anyone were to say as against the argument from the motion of light that certain rays are attached to the sun and illuminate by transferred activation, needing no movement from above to the earth because they are always attached to the sun, this would be most of all contrary to experience. For the sun, the moon and fire and so on illumine in the same way, and he will not be able to say this of fire or any of the others.

[328,33] And when I light a fire in the dark in a huge house by rubbing kindling, the light occupies the whole house without taking time.

[328,35] Moreover, it is when the air has condensed that the sun is invisible, while our total locality is illuminated.

[328,36] Of the rays of the sun I shall ask whether they are bodies or incorporeal and whether the rays pass through the whole of the air or not through the whole of the air. And the same problems will fall on [them]. H L-T

(22) Philoponus *in DA* 330,19-27

Light, then, is not a body but the actualisation of transparency as such, arising from the productive agent. Now the primary and strictest productive agent is the sun and secondarily all the things that have a share in some efflux from it and become themselves illuminative, such as the moon and the other stars and fire. For in the sun God set the primary light source. Thus we avoid all the problems raised; there is neither passage of body through body, nor is the actualisation's occurring all at once without taking time an impossibility, as it is incorporeal. H L-T

Reading

Jean Christensen de Groot, 'Philoponus on *de Anima* 2.5, *Physics* 3.3, and the propagation of light', *Phronesis* 28, 1983, 177-96.
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John Finamore, 'Iamblichus on light and the transparent', in H.J. Blumenthal and E.G. Clark, eds, *The Divine Iamblichus*, London 1993.
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Richard Sorabji, 'John Philoponus', in Richard Sorabji, ed., *Philoponus and the Rejection of Aristotelian Science*, London & Ithaca, NY 1987, at 26-30.
On supracelestial light:
Richard Sorabji, *Matter, Space and Motion*, London & Ithaca NY 1988, 109-19.

19(c) 'Actualised state of transparent'

The meaning of 'actualised state of the transparent': Aristotle means being actually seeable-through.

(1) Philoponus *in DA* 324,27-35

He [Aristotle] says that light is the actualisation (*energeia*) of transparency as such, meaning its form and fulfilment. For, when the transparent is potentially [transparent], light supervenes to give it form and realise it and make it actually transparent. For there is in air and water and similar things the nature of transparency, which, in the absence of light, is not actually transparent. For we would then see no colours through it. In the presence of light, on the other hand, it has its proper form and realisation, and that is why, in the presence of light, we see through air or water but not through earth, since it obviously lacks even potentially the nature of transparency. H L-T

19(d) Instantaneous diffusion of light

The instantaneous diffusion of light is not a form of travel, as light does not reach one point before another. Talk of travel should be taken as referring to the direction of influence only (Sorabji, as below). Philoponus compares, *in DA* 330,15-19, the instantaneous vibration throughout of a reed upon contact, although he rejects the corporealist suggestion, 328,27-31, above that corporeal rays of light are fixed to the sun, and avoid the need for travel that way. Aristotle *Sens.* 446a20-447a11 contrasts light with sound, which here and in *DA* 2.8, 419b25-7 he treats as a block of moving air, though in his treatment of dream prophecy, not speaking of sound, he allows for the possibility of a wave moving through air or water, *On Divination through Sleep* 464a6-11. These other passages are translated and wave motion is discussed in **Psychology 1(d)**.

19(d) Instantaneous diffusion of light

(1) Aristotle *Sens.* 6, 446a20-447a11

One might be puzzled about the objects of perception or the changes coming from them – whichever way perception works – as to whether, when they act, they reach the midpoint first. That is what odour and sound evidently do. For the person who is closer perceives the odour first, and the sound arrives after the blow. Does the thing seen and light behave like this? Empedocles says that the light from the sun arrives in this way first at the intervening space before reaching our sight, or the earth. It might be thought plausible that this happens. For what is in motion is in motion from here to there, so that there must also be a time in which it is in motion from one to the other, and time is all divisible, so that there was a time when the ray was not yet being seen, but was travelling in the intervening space. Granted [reading *kai ei kai*] everything has heard as soon as it is hearing, and in general has perceived as soon as it is perceiving, and there is no process of coming to hear or perceive, but hearing and perceiving are in existence without such a process. Nonetheless, do colour and light behave like sound, which is not yet at our hearing, when the blow has already been struck? That is shown by the re-shaping of phonemes, which shows that travel is taking place in the intervening space, since people evidently fail to hear what was said because of the air being re-shaped as it travels. For things see and are seen not in the same way as things are equal, by being disposed in a certain way (*pôs ekhein*), or they would not need to be each in a given place. To things becoming equal it makes no difference whether they are near or distant from each other.

[446b13] Rather, it is plausible for sound and odour that this happens. For it is as with air and water: they are continuous, but their movement is divided into parts. And that is also why in a way the first person and the next hear and smell the same thing, and in a way not.

[446b17] But it is thought by some [Gorgias at 'Aristotle' *On Melissus, Xenophanes and Gorgias* 980b9-11] that there is a puzzle about these cases too. For they say it is impossible for different people by different means to hear, see, or smell the same thing. Several people, separate from each other, cannot hear or smell a single thing, or the single thing would be separate from itself. Or do they all perceive the same numerically single first mover, for example the bell, or incense, or fire, but a personal (*idion* [cf. Plato *Theaetetus* 154A]) object of perception which is numerically different, though the same in kind, which is why several people see, smell, or hear at the same time? These objects are not bodies, or this would not have happened, but are an effect and a change, yet not without body.

[446b27] But about light it is another story. For light exists through something [sc. fiery stuff] being present, and it is not a movement. And in general, things are not alike in the case of change of quality and of movement. For it is understandable that movements should reach the intervening space first, and sound is thought to be a change in something in movement. But changes of quality are no longer like this, for it is

possible to be changed in quality in one go (*athroon*); not half before whole. For example, water can freeze all at once. Admittedly, if what is being heated or frozen is large, adjacent areas are affected by each other, but the first area is changed by the thing itself that is causing qualitative change, and it does not [all] have to be changed in quality simultaneously and in one go.

[447a6] Tasting would be like smelling, if we resided in a fluid and perceived flavour from a distance, before touching it.

[447a8] It stands to reason, then, that not all the areas intervening in front of the sense organ should be affected simultaneously, except, for the reasons given, in the case of light, and for the same reason in the case of seeing too, since light produces seeing. RRKS

(2) Theophrastus *ap.* Simplicium *in Phys.* 107,12-16, FHS&G 155C

And Theophrastus, in the first (book) of his *On Motion*, clearly holds the same opinion about this. He speaks as follows: 'Concerning the necessity for what is in movement to be in movement and for what has moved to have moved, is it permissible to say, what also applies to bodies where change of quality is concerned, that the half does not always precede (the whole) but sometimes (the change takes place) all at once?' FHS&G 155C

(3) Theophrastus *ap.* Themistium *in Phys.* 197,4-8, FHS&G 155B

Well, Alexander thinks that all change is in time, but Theophrastus seems to be in doubt; and perhaps he was unsure about changes from darkness to light, for example when a lamp is brought into a chamber, and all the room is at once filled with brightness and light with no time (interval). FHS&G 155B

(4) Alexander *in Sens.* ad loc., 31,9-18

For water which is much denser [sc. than air] does not extinguish it [sc. the fire said to be emitted from the eye]. If they were to say that what is sent out is light, it would need to be demonstrated to them that it is without body and unable to be sent out and poured forth, as they say. For [light] comes about depending upon a relation (*skhesis*) between that which is naturally illuminated and that which is able to illuminate. For this reason there is not a movement of light. At any rate, so far as concerns things which can be illuminated from the same distance by [that which naturally illuminates], we see both the things that are illuminated which are close to the natural illuminant and those which are far away from it at the same time. This would be impossible if light were a body. It is clear that light is a relation, and is dependent upon a relation between the illuminant and the illuminated, and is not a substance and body, from the fact that [light] does not persist even for a little while when the illuminant has been turned away. AT

(5) Philoponus *in DA* 329,30-330,27

There is no need to inquire how the activity (*energeia*) of colour, having left its own substrate, arrives at sight, as it occurs in the substrate of air and through this acts on sight. It is just as the activity of a carpenter passes through the adze to the wood and acts on the wood, shaping it in a given way, having, however, no similar effect on the adze as on the wood. As in such cases, so too with light we assert that an incorporeal actualisation (*energeia*) is emitted from the illuminating body to the transparent things that are constituted to receive it. Just, too, as fire, even at a remove, warms us not by travelling to us itself but by its warming of its adjacent air, so constituted as to be affected by fire, and by that air's becoming, on being warmed, such as to warm its environment and by this occurring throughout, so that even the things most remote from the fire are warmed, primarily by the fire but in a secondary sense by what is adjacent, so with the transparent bodies which also form a sequence. For the [celestial] spheres touch each other and in turn the totality of air around us touches the last sphere, while water touches [the air] in turn. So the sun acting immediately on the adjacent body which touches it, makes it actually (*energeiai*) transparent and this, becoming so, has the capacity to act itself on its environment to make it such and so the illuminative capacity descends on down to the last in the series, not by the immediate passage of the sun's activity (*energeia*) to the last in the series but with the adjacent and initially affected bodies being able themselves to produce a similar actualisation (*energeia*) in those that receive it. But that the actualisation occurs instantaneously (*athroos*) throughout is not surprising, since the actualisation is incorporeal.

[330,15] If the end of a long, taut reed were to be agitated, the whole reed would take no time to be moved through the continuity of the parts, the first part moving its neighbour, so we should think that it happens with the activity (*energeia*) of light, as all the bodies in the cosmos are in contact with each other. Light, then, is not a body but the actualisation (*energeia*) of transparency as such, arising from the productive agent. Now the primary and strictest productive agent is the sun and secondarily all the things that have a share in some efflux from it and become themselves illuminative, such as the moon and the other stars and fire. For in the sun God set the primary light source. Thus we avoid all the problems raised; there is neither passage of body through body, nor is the actualisation's occurring all at once without taking time an impossibility, as it is incorporeal. H L-T

(6) Philoponus *in DA* 344,33-345,13

After showing that light is not a body, he refutes those who have supposed it was, of whom one is Empedocles, who claimed that light is an effluent body from the illuminating source and arises first in the interspace be-

tween heaven and earth and then reaches us, though this motion escapes our notice through its speed. This, says Aristotle, is contrary to both reason and experience. Light is not seen moving and so reaching us and to claim an unperceived motion might be accepted over a small distance but that the motion is unperceived right across from East to West is indeed too great a demand. Through the arguments against Empedocles he gives yet another proof that light is not a body. If it were a body it would need motion to reach us and so also time, as also motion is in time. However, in fact things both near and far from the source are illuminated simultaneously. It is, as already remarked, contrary to reason to say that so great a motion is unperceived. 'If anyone else has so argued...[Aristotle *DA* 418b21]' refers to Plato, who also, in the *Timaeus*, seems both to say that light is a body and that it reaches us by efflux. H L-T

Reading

Richard Sorabji, 'John Philoponus', in Richard Sorabji, ed., *Philoponus and the Rejection of Aristotelian Science*, London & Ithaca, NY 1987, at 26-30.

19(e) Light not like the activity of colour

Light is not like the activity of colour a messenger, but the two are otherwise analogous: light, with one exception, is treated as a precondition of sight, but not as a messenger. The exception is that Philoponus reports as incorrect at *in DA* 325,33-5, the theory that in the special case of the stars, they send their light so as to be apprehended by our sight. Philoponus rejects travel for both light and sight. In seeing he believes that the activity of colour influences our sight, not by travelling, but like a reed that vibrates instantaneously on contact, *in DA* 330,15-19 above, except that it is incorporeal. Light is not what conveys us information, but Aristotle sees an analogy between light, the activity of colour and (thirdly) the incorrect postulate of sight travelling out. None of the three can correctly be counted as corporeal *in DA* 326,38-327,1; 329,3-4; 329,35-7, all involve directionality and respect the geometrical principle of reflection at equal angles, 331,1-7; 13-27. If the direction is the opposite one in the incorrect theory, Aristotle himself did not mind this, 331,27-33; 333,21-35 because, since the Geometry would be the same, he enunciated without objection the incorrect theory of outward travel in his *Meteorology* 3.3ff. as being easier to follow.

(1) Philoponus *in DA* 325,33-5

But against this they say that the things seen somehow come to meet sight, since light is emitted from the celestial bodies which meets sight in advance and so lets itself be apprehended. RRKS

(2) Philoponus *in DA* 331,3-7

Just as they suppose the rectilinear emission of sight and rays (*aktines*) and their reflection from smooth bodies at equal angles, so we suppose that

the activities (*energeiai*) of colour too, and light as well, are emitted in straight lines and reflected from smooth bodies at equal angles. RRKS

Reading

Richard Sorabji, 'John Philoponus', in Richard Sorabji, ed., *Philoponus and the Rejection of Aristotelian Science*, London & Ithaca, NY 1987, at 26-30.

20. Mixture

20(a) Potential existence

Potential existence of ingredients in Aristotle: Aristotle made three requirements that genuine chemical mixture (*mixis*) must satisfy. It is not a mere juxtaposition of particles, for then the ingredients would remain unaltered. Secondly, it is not a destruction of one or more of the ingredients, as when a drop of wine loses its defining characteristics in the sea (*GC* 1.10, 327a34-b6). Thirdly, it does not involve the ingredients being in the same place, because body cannot go through body. Aristotle meets these requirements as follows: Instead of juxtaposition, we have a homogeneous *tertium quid*. But the original ingredients have not been destroyed, because they still exist *potentially*. On the other hand, they are not in the same place, because they are not existent *actually*.

(1) Aristotle *GC* 1.10, 327b22-31

Since some things are potentially (*dunamei*), and others actually (*energeiai*), existent, ingredients can be in a way and yet not be what they were before being mixed, and need not be destroyed. What comes into being out of them differs from them and exists actually, yet each still exists potentially. This [destruction] was the problem raised by the earlier argument, but the ingredients formerly came together from being separated, and can be separated again (*khôrizesthai palin*). So they neither persist in actuality like body or whiteness, nor are they destroyed – neither one nor both – because their power is preserved (*sôzetai hê dunamis*). RRKS

It is important that the original ingredients should persist in some sense, if they are to play the role of matter, which for Aristotle persists through change. But there are problems as to *how* the original ingredients still exist potentially, rather than being destroyed.

I have translated Aristotle as saying that the ingredients are not destroyed because their power is preserved, as if this was some kind of explanation. But Alexander denies that their *power* is preserved and Aristotle might merely be repeating the point which needs explanation, that their *potentiality* is preserved. Aristotle also says that you can by suitable processes separate the ingredients again (on Philoponus see below), but Alexander demurs: What you can recover, in his view, will not be the original ingredients, or else they would have been merely juxtaposed.

(2) Alexander *Mixt.* 231,8-10

The agent, when acted on in turn by the body affected by it, and not remaining like itself, loses its power to act before it can completely overpower it. RBT

(3) Alexander *Mixt.* 231,22-9

Thus when certain things are added to them which can contribute to such an actualisation they easily recede to their own nature, not because the original (*proteron*) water and wine is separated out again (they were not, that is, preserved in the first place in the mixture, since that would just be juxtaposition and not blending; for where bodies have been blended, the whole product of the blend is one and uniform) but through such a blend being easily able to change into water [or wine], [and] changing into what was not originally mixed from such [constituents] with such a quality. RBT

There is a further problem addressed by Philoponus, as to how the ingredients can avoid destruction. Suppose the ingredients are the four elements, earth, air, fire and water. Then fire, for example, loses its defining quality of extreme heat, when restrained, or as Philoponus says chastised, by the opposing qualities of other ingredients. Philoponus defends Aristotle, as Frans de Haas has shown, by saying that what we have here is a third kind of potentiality different from the two Aristotle explicitly distinguished. The fire is not reduced to a mere first potentiality like that of a child who may one day become a geometer. Nor does it attain the status of a second potentiality, like that of a sleeping geometer, who can practise geometry as soon as he wakes. The fire is rather like a drunken geometer, who has lost some but not all of his power. Moreover, this third potentiality should be viewed as having a wide range or latitude (*platos*) stretching between first potentiality and second, *in GC* 271,1-24. For fire to avoid perishing and retain this third potentiality, it does not have to be maximally hot, but, as already allowed by Alexander *Quaest.* 1.6, can have a range of temperatures. This becomes clearer from the fact that Philoponus disagrees with Aristotle, as presented by Philoponus. Requiring that fire should be maximally hot, Philoponus' Aristotle concludes that the fire has perished. On the other hand, the quality hot has not perished, and it has a range of temperature characteristic of third potentiality (271,25-272,10). Moreover, it has another characteristic of third potentiality, and of drunkenness: it can, without having to undergo a wholesale change, become maximal again through the mere addition of something, whereas fire, having perished, would need to be re-created. When Philoponus says that the quality hot has not perished, he presumably allows that the original instance of heat has perished, for he argues at *in GC* 65-6 that in the different case when water is converted by boiling into air, the persisting fluidity is not numerically the same.

The application of the idea of third potentiality and latitude to the state of our souls at birth, found in Philoponus *On Aristotle On the Intellect* 36,70-40,43 is translated under **Psychology 5(c)**.

(4) Philoponus *in GC* 65,22-66,9

Someone might wish to add this too to what has so far been said: strictly speaking, it is not *the same* fluidity that is in air and in water, nor precisely the same transparency, because air is both more transparent and more fluid than water. So neither the fluidity of the water nor its transparency remained unaffected in the change from water to air, since the warmth that is in air and [that which is in] fire are not specifically identical either. And

in composite things too there are many things hot in the generic sense, but specifically different; for the heat that is in wine is different from that which is in pepper or castoreum or balsam or similar things. It should be known, therefore, that the same sort of thing happens in the case of the coming-to-be of the elements from each other as happens if blood comes to be from wine, when the whole form of the wine perishes and the heat that is in the blood comes to be as a specifically different heat.

And if someone wanted [to hold the view] that heat in fire and air or fluidity in water and air are not specifically different, but differ only in being of greater or less intensity, they would have nevertheless to agree with this point at least, namely, that these qualities are numerically different. For when mustard or pepper is sown it produces specifically the same heat in the plants which grow from it, which are of the same species as it, but for all that, the quality that is in the seed and that which is in the fruit which comes to be from it are admittedly numerically different. In the same way, in the case of the elements too, the whole form of the air has to be understood as perishing when the water comes to be. So even if someone agrees that specifically the same fluidity and transparency is produced in the water, he will still be compelled to say that it is numerically different. In that case nothing remains of the air except the matter. The change, then, is not from something already possessed of form, to something possessed of form, but from something unformed to something possessed of form, given that only that which is unformed remains. So the change from water to air is not change of quality. CJFW

(5) Philoponus *in GC* 202,21-5

For mixture is not destruction. Both ingredients remain potentially, not actually, what they were before being mixed, having their distinctive qualities restrained (*kolazesthai*), but needing an addition, each in accordance with its own quality, not a wholesale change, in order to become in actuality what it was. A wholesale change is generation or destruction, not mixture. RRKS

(6) Philoponus *in GC* 271,1-24

For the simple [elements] exist potentially, not actually, in the compound. But this is not with a first potentiality like that with which matter is said to be potentially either of two contraries. For matter is wholly deprived and has nothing of the fiery form, nor of the form of water, forms which it [sc. matter] is said to be potentially. The compound, on the other hand, possesses, even if not in purity, the form of fire as restrained (*kekolasmenon*), and this whole is fire, not pure, but, as I said, restrained.

But is this not in the second sense of potentiality, the sense in which one who has the knowledge and disposition (*hexis*) for building is called a builder potentially, when he does not have these deployed, because of some

obstacle, or because he is asleep, or is short of materials? No, it does not appear to be meant in this sense either. For we cannot say that the compound has the capacity and disposition for pure fire, but without deploying them. It does not have the capacity for fire, since if it did, it would act accordingly when [combustible] material was present, whereas it is not seen acting like that.

There is then some yet other sense of potentiality besides these familiar ones, a sense which Aristotle appears to mention in the seventh book of the *Physics*. It is clear from the following that there is yet another sense of potentiality. What is in accordance with [mere] fitness (*epitêdeiotês*) and what is in accordance with [actual] possession (*hexis*) are the extreme points, but all of what is between these extreme points is different, for example the changes in the creation of a house. For the house that is being built is not potentially a house in the same way as are the stones and timbers, nor is the developing embryo potentially a human in the same way as is the seed, nor is the child who has come to the time for learning potentially skilled in grammar in the same way as is the newborn child, nor yet in the same way as the child who is finally being taught. And even in this the latitude (*platos*) is great, for one thing is closer to the form, another more distant. RRKS

(7) Philoponus *in GC* 271,25-272,10 (continuing preceding translation)

[1] So this [i.e. the account summarised above] is obvious, but, one must know the following which is worthwhile remarking. For someone will say that if we say that the purely hot has not perished *qua* hot but it has perished *qua* purely hot, we can no longer say that fire too has perished *qua* pure fire but not *qua* fire as such. For if fire insofar as it is fire is seen as maximally and purely hot (fire *qua* fire is not hot to some and cold to others but maximally hot) – if, then, you say that the maximally hot *qua* maximally hot has perished, and fire *qua* fire is maximally hot, it is clear that fire insofar as it is fire has perished in the compound. Moreover, it will be true to say that fire insofar as it is fire has completely perished, but the hot *qua* hot has not perished without qualification, but [only] *qua* maximally hot.

[2] And this stands to reason. For it is not the same to say 'hot' and 'fire', since it is not the case that if something is hot, it is fire. Rather, if something is maximally hot, it is fire, and if something is fire, it is maximally hot. If fire *qua* fire has completely perished, it is clear that the compound is fire in potentiality according to the first sense of 'in potentiality', according to which we also say that matter is fire in potentiality. The compound does not possess anything of fire in virtue of which [fire] is fire.

[3] However, what has been stated remains true of the hot. Since it has perished *qua* maximally hot but not *qua* hot without qualification, it stands to reason that the compound is not called maximally hot in potentiality

according to the first sense of 'in potentiality', but it will be called this according to the distinctions made above. FDH

Reading

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Frans de Haas, 'Mixture in Philoponus. An encounter with a third kind of potentiality', in J.M.M.H. Thijssen, H.A.G. Braakhuis, eds, *The Commentary Tradition on De Generatione et Corruptione: Ancient Medieval and Early Modern*, Turnhout 1999, 21-46.

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20(b) Bodies juxtaposed, qualities mixed

Although Aristotle distinguishes genuine mixture (*mixis*) from juxtaposition, he thinks that mixture starts through the juxtaposition of globules, *GC* 1.10, 328a33-5, and some later Aristotelians, unnamed, are reported as saying that only the qualities, not the substances or bodies, of the four elements mix (Galen *in Hippocr. de Nat. Hom.*, vol. 15, Kühn 32 = *SVF* 2.463; Arius Didymus, *Epitome* fr. phil. 5, *Dox. Gr.* 449,1-3, from Stobaeus 1.17). Plotinus reports the same theory more fully without explicit attribution, 2.7 [37] 1 (8-9; 15-19); 2.7 [37] 2 (10-12). The theory has the advantage of explaining why a mixture, say of wine and water, normally has a volume equal to the sum of the ingredients' original volumes. But Plotinus rejects the theory in 2.7 [37] 2 (7-26).

Alexander agrees that genuine mixture starts with the juxtaposition of globules that have been divided up very small, *Mixt.* 231,12-19. But he denies that genuine mixture can be completed through a process of smaller and smaller division, for if the division is finite, permeation will be incomplete, while infinite division is impossible, *Mixt.* 221,25-222,26.

Porphyry, as I read the account borrowed from his *Summikta Zêtêmata* by the Bishop Nemesius, thinks that ordinary mixtures of wine and water are not mixtures in the strict sense (*akribôs*), i.e. what the Stoics were to call blends (*kraseis*), but are only microscopic juxtapositions, as shown by the fact that the wine and water can be re-separated, *ap.* Nemesium *On the Nature of Man* 128,4 Matthaei = 39,5-11 Morani.

Proclus goes further and defends Plato's theory in the *Timaeus* of juxtaposed triangles by saying against Alexander that if particles were more than merely juxtaposed, they could not be re-separated again, *ap.* Simplicium *in Cael.* 660,7-8. But Alexander had already conceded (*Mixt.* 231,22-9, translated above) that what you can recover is not the original ingredients. Proclus further held, *ap.* 'Simplicium' *in DA* 134,5-13, that sunlight permeates the air only through the juxtaposition of finely minced particles of air and light. But this is too much for 'Simplicius', since there would not be complete permeation.

Simplicius, who cites Proclus, goes on to offer a fresh variant on the appeal to juxtaposition. In the so-called blending of bodies, and in the mixture of four elements, the juxtaposed particles remain merely adjacent. In Aristotle's terms, *Phys.* 5.3; 6.1, this means that their edges remain distinct, albeit together, instead of becoming one. The bodies are not unified into a single continuous body as Aristotle and Alexander required, Aristotle *GC* 1.10, 328b22; Alexander *Mixt.* 231,11-16. On the other hand, Simplicius borrows the neo-Aristotelian account, for the juxtaposed bodies alter each other's qualities, although this effect lasts only as long as they remain juxtaposed, *in Cael.* 660,26-661,14.

(1) Aristotle *GC* 1.10, 328a33-5; b22

And little bits juxtaposed (*paratithemena*) with little bits mix (*mignutai*) more, because they change each other more easily and quickly, whereas a large quantity changed by a large quantity takes time to do this.

Mixture is the union (*henôsis*) of ingredients after they have been changed in quality. RRKS

(2) Plotinus 2.7 [37] 1 (8-9)

Those, then, who mix only the qualities, juxtaposing (*paratithenai*) the matter of each body, and spreading the qualities from each over the matters, would be persuasive. RRKS

(3) Plotinus 2.7 [37] 1 (15-19), translated under **20(d)(iii)**

(4) Plotinus 2.7 [37] 2 (7-26)

When water runs through wool, or when papyrus exudes the moisture in it, surely the entire body of the water runs out of it? Or even if it doesn't, how will we be able to put matter in contact with matter, volume (*onkos*) with volume, yet cause only the qualities to admix? For the matter of the water will not lie alongside and separate from the papyrus, nor in any of its interstices; for the papyrus is moist in its entirety, and its matter is at no point lacking the quality of moistness. And if the matter is imbued with the quality through and through, the water is in the papyrus through and through.

No: Not the water, but the quality of the water.

But where is the water? and why is the volume not the same?

Well, the addition has extended the papyrus, which has taken on size (*megethos*) from what has entered it.

But if it did, then some volume was added; and if it was added, then it was not absorbed in the papyrus, and so the matter must occupy different places.

Well, body gives something of its quality to another and receives something in return; could this not be the case with size?

No: When one quality joins with another it does not remain that quality,

but is compounded with the other and thereby does not remain pure and is no longer entirely what it was, but is blurred. But when a size is added to another size it is not obliterated. BF

(5) Alexander *Mixt.* 231,12-19

Contributing to the rapid alteration and blending of fluid bodies is their easy divisibility; for they divide one another before being unified, and are juxtaposed together in small parts, thus interacting more easily and more quickly, and they rapidly become one body both in substrate and quality – a body not in actuality any of the bodies that have been mixed, but in potentiality all of them, and deprived from preserving in actuality the bodies mixed in it only to the extent that it is removed from them by the interaction caused by their individual powers. RBT

(6) Alexander *Mixt.* 221,25-222,26

Furthermore, if blending occurred through the constituents dividing one another (for blending occurs this way particularly in liquids because they are easily divisible and one [constituent] will easily pervade the other and divide it, as we see in the case of wine poured into water and blended with it), then if the bodies dividing one another leave behind some mutually undivided parts, those parts would not be blended (for the undivided parts must be unmixable and unmixed – if, that is, blending and mixture *qua* blending occur by division and have this as their ultimate limit; thus blending would again occur by juxtaposition and certainly not through the bodies that have been blended pervading one another totally). On the other hand, if the constituents leave no undivided remainder in the blend they would be divided through and through, and not into parts but into divisions [sc. without thickness], if no particle of them remains beyond the division. [222,1] Then if each body is reconstituted through the composition of the bodies into which it has been divided, the bodies that have been divided in this way would be composed neither of parts nor bodies, but divisions; for a division is not a body but something a body undergoes (*pathos*).

[222,4] The consequence for those who describe division as continuing to infinity is either that it is impossible to speak of a body being in actuality divided through and through and to say that in this way they are totally mixed or that bodies are in actuality divided into infinites. For if they say that bodies are divisible to infinity through the division never letting up, but there always being a residue from what is undergoing division capable of being divided, then it will be impossible for a body to be divided through and through so that it leaves no remainder able to undergo division. But if this is so, the constituents would never be totally blended, if they *are* blended with one another and extended in dividing one another, <yet incapable of so dividing one another> that no undivided parts are left as a

remainder; for they would remain unmixed with one another with respect to the undivided parts.

[222,14] But if they claimed that bodies were divisible to infinity in that every body that has been divided can be actually divided to infinity, then according to them the bodies that have been blended with one another would be actually divided into infinites; for if there is blending through and through there must be division through and through.

[222,17] But [constituents] that are divided through and through [are divided into infinites], and if the things into which they are divided are also themselves magnitudes, each of the things being mixed in this way would be infinite (for the sum of infinites with size and extension is infinite; for each of the bodies that have been blended is formed of infinite bodies that have some size, if something must be composed of just the things into which it is divided, and this would result in there being still further additional infinites).

[222,22] But if the remainder produced by the division of the bodies divided through and through are not magnitudes (for they certainly will not say that there are some minimal and indivisible bodies) then their magnitude would be composed of magnitudes – also a consequence of the theory that points are parts of the line. RBT

(7) Porphyry *Summikta Zêtêmata* paraphrased in Nemesius *On the Nature of Man* 128,4 Matthaei = 39,5-11 Morani

Also the blending of wine and water brings both to an end, for the blend is neither pure water nor wine. However, [in fact] a blend of *this* sort comes about by juxtaposition, which escapes perception because of the smallness of the parts of the things mixed, but is evident from the fact that they can be separated again from each other. For a sponge impregnated with olive oil raises up (39,10) the water pure, as does papyrus, whereas it is altogether impossible to separate perceptibly things unified (*hênômena*) in the strict sense. RRKS

(8) Proclus *ap.* Simplicium *in Cael.* 660,7-8

Proclus says, 'do not be surprised if there is juxtaposition, not unification, for the ingredients needed to be separable from each other'. RRKS

(9) 'Simplicius' *in DA* 134,5-13 reporting Proclus

'For two bodies cannot be together in the same place' [Aristotle *DA* 418b17]. Material (*enula*) bodies, without a doubt. How then is the fiery light in the air? For they will not go in little pieces through each other's pores, as Proclus supposes, both because the whole air is seen to be wholly illuminated throughout itself and because the continuity of the light with its cause would not be preserved and because the illuminating source would

not be active through all of its parts, being impeded by what resisted it, nor would the whole of its surface be seen by us all at once when also the rays from our eyes, as they say, pass through the pores of the transparent. CS

(10) Simplicius *in Cael.* 660,26-661,14

[1] So even when the four elements, juxtaposed to each other, exchange qualities and in some way alter each other towards themselves, even so their bodies themselves neither pervade one another nor are they unified with each other nor do they change into each other completely. This is evident from the fact that the elements are separated again in the case of corruption, and each of them moves towards its own wholeness because they inhered in actuality.

[2] For if each lost its own form during composition, how does it receive it again on the corruption of the composite? For even if in the composite they change towards each other and the water in us is made airy and the air blazes up, even so their bodies hold together by contact, and generally constitute an analogue to glue used in the arts. The glue does not make things continuous either, because the limits of the things glued together do not disappear.

[3] It is rather as when a number of torches come together and all their flames mix and appear to be one, but when the torches are separated, each torch's own flame and the light it spreads are drawn apart with them. In this way too the conglomerate of the four elements displays a single appearance while their bodies are adjacent to each other and mutually alter each other by means of their qualities. In the same way a song composed of different sounds mixed by juxtaposition in small parts also appears to be a unity. Some such thing the so-called blend is too: a common alteration of bodies adjacent to each other, as long as they are adjacent. FDH

Reading

Frans de Haas, 'Mixture in Philoponus. An encounter with a third kind of potentiality', in J.M.M.H. Thijssen, H.A.G. Braakhuis, eds, *The Commentary Tradition on De Generatione et Corruptione: Ancient Medieval and Early Modern*, Turnhout 1999, 21-46.

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20(c) Stoics on actual existence

Stoics on actual existence of ingredients in the same place: the Stoics were the most sharply opposed to Aristotelian views. Alexander reports them as holding that the ingredients in a genuine chemical mixture (their word is *krasis*: blend) exist both actually, and in the same place as each other. Unlike Aristotle, who took the idea of bodies in the same place to be absurd, I think this was a perfectly reasonable hypothesis, avoiding the obscurities of potentiality. They offered at least two pieces

of evidence, arguing first that the qualities (and perhaps the ingredient stuffs) are preserved in a blend, because the qualities 'show forth together' (*sunekphainesthai*), Arius Didymus fr. 28. You can taste the lime juice and orange juice together. Aristotle might be forced to argue that in these cases we have not chemical mixture, but juxtaposed globules. He might seek to make this plausible by arguing (see **21**) that the two ranges of proportions on which these two flavours are based are not ranges which could enter into a chemical mixture, but the task would be difficult.

Secondly, the Stoics argued that the qualities, nature and substance of the ingredients are preserved, by pointing (Arius Didymus fr. 28; Alexander *Mixt.* 216,32-217,2) to the reseparability (*apokhôrizesthai, khôrizesthai palin*) of the ingredients. The example given by Arius Didymus (fr. 28) below and Porphyry *Summikta Zêtêmata* above of using an oil-drenched sponge to re-separate wine and water has been experimentally confirmed in my presence by Connie Meinwald and Wolfgang Mann.

The Stoic appeal to re-separation may be what led Alexander to modify Aristotle's theory, to say that it is not numerically the same ingredients that can be recovered, *Mixt.* 231,22-9 translated above. But he thereby weakened the sense in which the ingredients exist potentially.

(1) Alexander *Mixt.* 216,14-217,2

The opinion of Chrysippus on blending (*krasis*) is as follows: He supposes that all substance is unified, and that there goes through it all a certain *pneuma* by means of which the universe is held together (*sunekhetai*) and persists (*summenei*) and is sympathetic with itself. He says that for some of the bodies that are mixed (*mignumena*) in this substance the mixtures (*mixeis*) occur by juxtaposition (*parathesis*). Two or more substances are placed together (*suntetheimena*) into the same [volume] and juxtaposed (*paratithemena*) with each other by 'juncture' (*harmê*) as he says. Each substance in such a juxtaposition preserves (*sôzein*) its proper substance (*ousia*) and quality (*poiotês*) in its perimeter (*perigraphê*), as, say, with beans and wheat when these are juxtaposed with each other.

[216,22] Other mixtures occur by fusion (*sunkhusis*) through and through (*di' holôn*). The substances themselves and the qualities in them perish together with each other (*sumphtheiresthai*), as he says happens with medical drugs, when the mixing ingredients perish together and a different body is generated out of them. He says that other mixtures occur by substances and their qualities being mutually spread out along with each other (*antiparekteinomenai*) through and through (*di' holôn*). This goes with the preservation (*sôzein*) in such a mixture of the original substances and qualities. It is this mixture uniquely which he says is blending (*krasis*). He says that such a mutual spreading out along with each other (*antiparektasis*) of two or more bodies through and through, in such a way that each of them preserves in such a mixture its proper substance and the qualities in it, is the only mixture that is a blending. For it is a unique feature of blended ingredients that they can be separated from each other again (*khôrizesthai palin*), which happens only because the

blended ingredients preserve their own natures (*sôzein phuseis*) in the mixture. RBT

(2) Arius Didymus (fr. 28) *ap.* Stobaeum 1,153,24-155,14 Wachsmuth (= *Dox. Gr.* 463,14-464,8 = *SVF* 2.471)

Chrysippus used to affirm something of the following sort. What exists is *pneuma* that moves itself towards and away from itself, or *pneuma* that moves itself backwards and forwards. It is taken to be *pneuma*, because it is said to be air in motion. Something analogous occurs with the aether also, so that it and the aether even coincide in the same definition. Such a motion occurs only according to those who think that all substance admits of change and fusion (*sunkhusis*) and composition (*sustasis*) and commixture (*summixis*) and natural association (*sumphusis*) and things like that.

For members of the Stoic school like to distinguish juxtaposition (*parathesis*), mixture (*mixis*), blending (*krasis*) and fusion (*sunkhusis*). They say that juxtaposition is the mutual contact of bodies at their surfaces, such as we see in the case of heaps in which are included wheat and barley and lentils and anything else like them, and in the case of pebbles and sand on the sea-shore.

They say that mixture (*mixis*) is the mutual spreading out along with each other (*antiparektasis*) through and through (*di' holôn*) of two or more bodies, with their naturally associated qualities persisting (*hupomenousai*) as happens with fire and glowing iron. In their case, the mutual spreading out of the bodies [fire and iron] along with each other occurs through and through. And it happens in a similar way too with the souls within us: they are mutually spread out along with our bodies through and through. For the Stoics like body to be mutually stretched along (*antiparêkein*) through body (*sôma dia sômatos*).

They say that blending (*krasis*) is the mutual spreading out along with each other through and through of two or more fluid bodies, with their qualities persisting (*hupomenein*). (They say that mixture occurs with non-fluid bodies as well, like fire and iron, or soul and the body that surrounds it, but that blending occurs only with fluid bodies.) [They speak this way of the blending of fluids], because (*gar*) the qualities of each of the blended fluids show forth together (*sunekphainesthai*) out of the blend, for example, the qualities of wine, honey, water, vinegar and the like. That the qualities of the blended ingredients survive (*diamenein*) in such blends is already clear (*prodêlon*) from the fact that the ingredients are often separated from each (*apokhôrizesthai*) by some device. Certainly, if you dip an oil-drenched sponge into wine blended with water, you will separate the water from the wine, as the water runs back into the sponge.

They say that fusion (*sunkhusis*) is the change (*metabolê*) of two or more qualities in bodies, to produce another quality differing from the earlier ones, as happens with the combination (*sunthesis*) of perfumes and of medical drugs. RRKS

Reading

Eric Lewis, 'Diogenes Laertius and the Stoic theory of mixture', *Bulletin of the Institute of Classical Studies* 35, 1988, 84-90.
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20(d) Objections

Objections to bodies in the same place.

(i) Resistance

It might be thought that those who define body as resistant (*antitupos*, see under 18 above) could thereby rule out bodies in the same place. But, first, bodies could be selectively resistant: Wine and water could mix with each other, but not with the spoon that stirs them. And secondly, bodies can mix with each other more or less easily, oil and vinegar resisting each other more than water and vinegar.

(ii) Bodies add volume or density

If what is admixed does not add to volume or density, it is not a body.

(1) Alexander *Mixt.* 219,9-28; 220,3-11

If they deny that bodies receive one another in this way, but say that insofar as they are full they go through one another, one might first inquire why any given body does not contribute to an increase in the size of a similar body in all dimensions (*pantêi*); for by such a mutual composition *quanta* make their compound greater than each of the components. Lines, for example, increase their length when compounded with one another at their points (for in such a compound they will necessarily have something beyond contact), and planes will do the same if they are compounded line by line, as will body by its three complete dimensions (*trikhêi te kai pantêi diestanai*) necessarily contribute to increasing the size of another body of similar dimensions with which it may be compounded.

[219,18] If this is peculiar to, and a *proprium* of, bodies, and if those who say that a body goes through body and makes the compound both less somehow and equal [to the constituents] abolish this, they would abolish the nature of body; for the subject of which the abolished property was a *proprium* is abolished along with its abolished *proprium*.

[219,22] It will follow according to them that the place until then occupied by the body [B] which comes to be in some body [A] in this way also becomes void, so that the body [A] in which it [B] comes to be occupies no additional place but is sufficed by the place filled by it [A] even before its mixture with body [B]. For the place occupied by it [B] will be void when the two bodies have moved into the place of one. For what is there that will

necessarily come to be in the place of the body [B] which is transferred into the body [A]?

In general a body that receives another body in itself must become no greater; for that is what 'to receive something in itself' means. There is no body for which the mixture of bodies preserves a mass equal to one of the constituents; for where it seems to remain equal there is no mixture of bodies but the cases involve either form and matter (as soul and body) or body and quality (as iron and heat) or a given change occurs into some other thing, as happens with ash. But neither qualities nor forms are bodies and certainly would not receive another body in themselves. RBT

(2) Alexander(?) *Mantissa* 124,13-20

Or how will the air not increase [in size] when so great a body is added to it? Or how does the light extend through it, when it is full, and [how] is it mixed with it? Or, if [the light] is moved around along with [the lamp], how is the light produced externally by the lamp united with it [the lamp]?

Further: How will the air in a room, when it takes on many qualities, not be increased? For in the same equal [space there are] both light and heat and odour and colour and sound. [If] all these are bodies and extend throughout the air in the room, how will they not increase it, and how will they not shatter the building? For the air in the wine-skin, if it is increased by a little, bursts the wine-skin. RWS

(3) Alexander(?) *Mantissa* 140,31-141,8

Further, what reason is there on account of which the bulk resulting from certain things when they are mixed is greater, while from others it remains the same? For to say that iron becomes denser by the mixture of fire [with it] is paradoxical; things that become denser undergo compression, but [the effect] of fire on iron is to expand it. Further, it is clear that [iron] is made less dense by fire; for when it has been heated it can be forged, whereas previously it could not. Further, if what is liquefied by something becomes less dense, and things that can be liquefied are liquefied the more by fire, fire will not make things denser. It would follow that one should say that charcoal too is denser than wood, and also illuminated air than that which is not; and yet [air] illuminated by the sun seems to be less dense than that which is not.

[141,1] Further, if someone were to place many torches or light [many] lamps in a small room, the air would become denser, being blackened [by the smoke], and as many bodies as there were sources of light would at the same time pass through one another and occupy an equal place; but these things are absurd.

[141,4] Further, if the soul and the body together with [the soul] occupy an equal place, and when [the soul] has been separated, [the place] occupied by the body is no smaller, what will be the place [occupied by] the soul?

For either there will be [some] void which it will occupy, or of necessity there will be some other body of a living creature into which it will migrate; and in this way soul will never be outside a body and a living creature. And the same argument [will] also apply to the fire that is in the iron. RWS

(iii) Expansion suggests juxtaposition

If what is admixed does add to volume, the best explanation, according to the Aristotelians, is that it is juxtaposed rather than being in the same place.

(4) Plotinus 2.7 [37] 1 (15-48) (following **20(b)(2)**)

Sometimes two bodies that have been mixed occupy a greater space than either of them singly, as much, in fact, as their own two spaces added together. Yet if the one had completely interpenetrated the other, the space, which is occupied by the one and into which the other is inserted, must remain the same. But when the space occupied is not increased, they claim that the entry of the other body has been allowed by some expulsion of air. Furthermore how could a smaller body be so stretched out as to permeate a larger one? They have much else to say.

[22] Those [i.e. the Stoics] on the other hand who have introduced total admixture (*krasis di'holou*) could claim that a body can be divided but not completely lost in the division even when the admixture is total, since they will say that sweat does not create divisions in the body or even perforate it. One might say that there is no reason to suppose that nature has not acted in this way in order to allow the sweat to get out; even so in the case of fine-grained and compact artefacts moisture can be seen to saturate them and to permeate from one surface to the other. But how is this possible in the light of the fact that both are bodies? So it is not easy to imagine how there can be interpenetration without division; but if the division is total they will obviously destroy each other.

[33] When they [i.e. the Stoics] claim that in many instances there is no increase in size they allow their opponents to give the exit of air as the reason. With respect to the increase of space occupied there are problems, but even so what prevents [the Stoics] claiming that there is bound to be such an increase because each of the two bodies contributes size along with its other qualities? For size is no more destroyed than the other qualities; just as in their case another form of quality is produced as an admixture of two qualities, so too the size is different – the admixture creates a size compounded from the two sizes. But if at this juncture their opponents were to say: 'If matter is ranged alongside matter, and volume (*onkos*) (which comports size) alongside volume, then you would be arguing our case for us. But if there were total interpenetration of the matter together with the size which is its most basic component, then the result would not be like the end-to-end abutment of two lines, when there is an increase, but like the superimposition of two lines which results in no increase.' BF

(iv) 'Sea in a cup' objection

If what is admixed does not add to volume, one could by successive admixtures fit the sea into a cup, or the heavens into a grain. The argument is also in Philoponus *Contra Proclum* 281,12-22.

(5) Alexander *DA* 20,8-15

For how can a body, which is full of itself and has no void within itself, admit into itself another body [that is] likewise full of itself? For if that which is full of itself admits something else again that is likewise full of itself, there will be nothing to prevent it from admitting another again and still another. For if it is no less full when it was by itself than now – when it admitted something else into itself, it was not prevented from admitting some further thing as well. Thus, nothing will prevent the largest [body] from coming to be in the smallest body. VC

(6) Alexander *ap.* Simplicium *in Phys.* 530,14-24

Alexander shows that this is impossible both in a separate work and in his commentaries by means of many arguments. First, if body permeates body, and everything permeates everything, if this is *qua* bodies, and they do not permeate each other *qua* hot or cold or as having some other difference, then, if body permeates body, the greatest will permeate the smallest. For it will be unchanged before and after reception. For it is not as if it then contained and now no longer contains empty areas and channels, since those who say that bodies permeate each other do not ascribe it to empty areas. So a body can receive a second and a third in the same way. In the same way, says Aristotle, the universe will be contained in a grain and the sea in a wine ladle. JOU

(7) Philoponus *in DA* 328,13-15

If it is claimed that it can pass through body because it is immaterial, the argument is especially hopeless. For in that case, the sky should be able to be compressed to a grain. RRKS

(v) Reply to the 'sea in a cup' objection

Some bodies, e.g. the heavens, are indivisible, so not liable to successive admixture by ladelling. See also Proclus *in Remp.* 2. 162,20-163,9 translated below, **20(e)**, on how the absence of prime matter precludes change and hence precludes division.

(8) Proclus *ap.* Simplicium *in Phys.* 613,14-20

He solves the first problem through the impassibility of immaterial (*aüla*) bodies. 'For', he says, 'the immaterial body neither exerts nor suffers

pressure. For what suffers pressure has a nature capable of being affected by things that press on it. But it neither divides nor is divided, being impassive, so that it is not possible to adduce the paradox that the whole will permeate the smallest part. For, if it is naturally indivisible, it could not be divided into parts equal to the smallest. But if that cannot be, nor could the whole permeate that part.' JOU

(9) Simplicius *in Phys.* 531,3-9

But if the sphere of each of the heavens is complete, extending right to the centre, it is clear that the heavens will permeate each other and the stars and the whole of the sublunary [region]. So perhaps sublunary bodies do not permeate each other, as being most material (*hulikôtata*), resistant and naturally separated, which is why when mingled they form something bigger, while celestial bodies are different. So the hypothesis of the heavens and the grain is also absurd, since the heaven is indivisible. JOU

(vi) Problems of counting

If the mixture of wine and water increases volume, how are we to count the resulting quantity of wine and of water?

(10) Alexander(?) *Mantissa* 141,9-16

Again, when a cup of wine is mixed with two of water, the whole blend or mixture comes to be three cups. But how according to them can it be? For if the cup of wine passed right through the water and was made equal with it, the whole will either be four cups (for the wine has become equal in quantity with the water and so consists of two cups: it will not still be one cup when equalised with two, since it was [said to be] impossible for double to be equal to half), or alternatively the water will be equal to the wine and will be one cup's worth, so that again the mixture consists of two cups. RRKS

(11) Philoponus *in Phys.* 506,2-12

Then if it is possible for one body to pass through another, a pint of water thrown into two of wine ought to make the whole not three, but two, pints, so that the same measured amount, two pints of wine, is kept constant. For if it is not only qualities, but actual bodies that pass through each other, for example water through the whole continuous body of wine, the combination should not occupy a larger place. Or if the pint of water passing through the two pints of wine does make the whole larger as a whole, the combination ought to turn into four pints, if the pint passes through the whole of [each of] the two pints. Or again if two pints of wine are thrown

on one of water, the combination should turn into one pint, since the two passed through the one. RRKS

Reading

Kit Fine, 'The problem of mixture" in Frank A. Lewis, Rob Bolton, eds, *Form, Matter and Mixture in Aristotle*, Oxford 1996, 217-30.
Eric Lewis, 'Diogenes Laertius and the Stoic theory of mixture', *Bulletin of the Institute of Classical Studies* 35, 1988, 84-90.
Richard Sharvy, 'Aristotle on mixtures', *Journal of Philosophy* 80, 1983, 441-8.
Richard Sorabji, *Matter, Space and Motion*, London & Ithaca, NY 1988, ch. 6.
Michael White, 'Can unequal quantities of stuff be totally blended?' *History of Philosophy Quarterly* 3, 1986, 379-89.

20(e) Bodies in the same place in Neoplatonism

Despite the objections to the Stoics, some Neoplatonists accepted bodies in the same place.

One rationale was that some bodies are in varying degrees immaterial. The talk of degrees suggests that immateriality consists in being more or less fine or tenuous. But Syrianus and Proclus seem to waver between this and another doctrine, that some bodies lack prime matter. Possessing matter is a prerequisite, according to Aristotle, for undergoing change. Matterless bodies therefore cannot divide each other, division being a kind of change. Consequently, they can pass right through each other without dividing each other. So Syrianus *in Metaph.* 85,15-28; Proclus *in Remp.* 2.162,20-163,9. The latter offers a definition of matter, which shows that a literal absence of matter is intended.

Examples of bodies that can pass through each other include:

(i) Vehicles of soul

Alexander had objected that vehicles of the soul are impossible because they would have to be in the same place as our fleshly body. The passages, translated under **Psychology 7**, come from a newly discovered fragment of Alexander's commentary on the *Physics*, to be published in the series of translations *Ancient Commentators on Aristotle*, and from Simplicius' less than accurate report of Alexander (Parisinus Suppl. Gr. 643, 101r and Simplicius *in Phys.* 964,19-23). The Neoplatonists reply that for vehicles interpenetration is possible. The vehicles of our souls can pass through some bodies, at least the heavens, in the same way as the light of two lamps. Syrianus uses for the two lights the term *asunkhutos*, without fusion, which had been used by Porphyry *Summikta Zêtêmata*, following Ammonius Saccas and Plotinus, for light and air and for soul and fleshly body (fragment *ap.* Nemesium *On the Nature of Man* ch. 3, translated under **Psychology 6(b)**). Simplicius, *in Phys.* 966,5-12, thinks it not impossible that the pneumatic vehicle of our soul should permeate our fleshly body. Philoponus attacks interpenetrating vehicles in the context of *Contra Proclum* cited in **(vi)** below.

(1) Syrianus *in Metaph.* 85,15-28

But the reason for which this whole discussion was set going is that neither these men, nor those who hold that simple immaterial (*aüla*) bodies pass

through each other without dividing each other, take it to be impossible for a couple of three-dimensional solids (*sterea sômata*) to come together. What they say is that it is absolutely impossible for two material (*enula*) and resistant (*antitupa*) bodies to occupy the same place, but that immaterial bodies resemble the light emitted from different lamps which goes right through the whole of the same building, the light of each lamp passing through that of the other without being fused (*asunkhutos*) or divided. Even if someone wants to call the light incorporeal, it still has the same extension (*sundiastanta*) as bodies and stretches with them over the three dimensions (*diastaseis*), and nothing prevents the light of each lamp occupying the same place as that of every other and of the various bodies. The reason is none other than that the light of each lamp is simple and immaterial and is not divided or parted, but is united with its source and so attached to it that it exists when the source is shining, and departs when the source leaves. In fact, nothing prevents the immaterial bodies attached to our souls from doing the same. RRKS

(2) Proclus *in Tim.* 3.297,21-298,2

For as they come down to earth the souls acquire from the elements a variety of tunics, airy, watery, and earthy, and then like this they are finally inserted into this dense volume (*onkos pakhus*). For how were they supposed to proceed immediately from the immaterial (*aüla*) *pneumata* into this body here? So even before they come down to it, they have non-rational life and the vehicle of that life prepared from the simple elements, and from these they sank into turbulence, so-called because it is alien to the natural vehicle of the soul, composed of all kinds of tunics, and a weight upon the soul. HT

(3) Proclus *in Remp.* 2.162,20-163,9

But the divine body is not somehow split (*skhizesthai*) by the vehicles' passage, nor is it added to when they ascend or subtracted from when they descend, but they pass through it undividingly and are inserted into their own orbits. For we have shown before that body passes through body, though this does not happen with all bodies, but either immaterial (*aüla*) ones pass through material (*enula*) ones or immaterial through immaterial (by 'matter' I mean what is basic and the substrate of the basic bodies). There are some bodies which are actually intermediate between material and immaterial, and these have the same quality in relation to one another as material bodies do, in that they are unable to pass through one another without division. Hence the light of the sun, being body, cannot pass through the body of the moon (refraction proves the affinity of the former with material bodies, and shadow the affinity of the latter; for the moon casts a shadow), nor can our vehicle pass through material volumes (*onkoi*) (for it too is intermediate between material and immaterial bodies), but

both it and the light of the sun can always go through the body of the heaven without the latter being divided by it. For all division is an occurrence which destroys the continuity of what is divided. RW

(4) Simplicius *in Phys.* 966,5-12

If this is the reason for the different vehicles, it is not necessary, perhaps, that when [the soul] is in this [i.e. the body] it also have the pneumatic [vehicle], but if it should also have it, it is not necessary that that [i.e. the pneumatic vehicle] be in this [i.e. the body] in such a way that body passes through body, while I do not even think that this is absurd, [namely] that higher and finer things, not of like nature, should pass through crasser and more material things; for in fact solar light, according to those who say it is body, is said to pass through the whole air, and the heavenly spheres, which are full and not just [hollow] vaults, since they are continuous with respect to the centre, pass through the whole [spheres] that are next [inside them]. DK

(ii) The light of two lamps

See also Syrianus *in Metaph.* 85,15-28, translated under **20(e)(i)**.

(5) Proclus *in Tim.* 2.254,13-14

For several lights making one light, nevertheless remain unfused (*asunkhuta*). RRKS

(iii) Solar light and the celestial spheres (but not the moon)

(6) Proclus *in Remp.* 2.162,20-163,9, translated under **20(e)(i)**

But there is a dispute about solar light and air. Proclus, reported by 'Simplicius' *in DA* 134,5-13, translated under **20(b)**, influenced by Plato's theory in the *Timaeus* of juxtaposed triangles, juxtaposes tiny particles of solar light with particles of air. But Simplicius *in Phys.* 966,5-12, translated under **20(e)(i)**, endorses the idea that solar light passes through air as well as through the celestial spheres.

For Philoponus on the other side, see **(vi)** below, partly arguing on the basis of the moon.

(iv) Supracelestial light

This constitutes the place of the universe in Proclus:

(7) Proclus *ap.* Simplicium *in Phys.* 612,1-35

If it is a body, it is either immobile or mobile; but, if mobile, it must necessarily change its place, so that place will over again require a place.

But that is impossible, as Theophrastus and, indeed, Aristotle agree. For at any rate he says that a vessel is a moving place and that place is an immobile vessel, since place is of its nature immobile. But, if place is immobile, it is either indivisible by the bodies that enter it, so that a body permeates a body, or it is divisible, as air and water are by things that come into them. But, if it is divisible, when the whole is split (*skhizesthai*) the parts will move to either side of that which splits it. So, in the first place, body will also be mobile, if its parts move; but it has been shown to be immobile. Next, when the parts are split, we shall investigate where that which split them went. For yet another interval will be found between the parts of that which was split which received the splitting agent, into which it moved and is said to be in a place, and so endlessly. Place, then, is an indivisible body. But if it is indivisible it is either immaterial (*aülon*) or material (*enulon*). But if it is material, it is not indivisible; for all material bodies, when other material bodies move into them, suffer division by them, as when our bodies fall into water. Only immaterial bodies are such as to be divisible by nothing. This is necessarily so; for every immaterial body is impassive, but no divisible body is impassive. For division is something a body suffers which destroys its unity, since you would find no happening other than division which takes away the continuity of the continuous *qua* continuous. So, to draw together all that has been demonstrated, place is a body that is immobile, indivisible and immaterial. If so, it is very obvious that it is also more immaterial (*aüloteron*) than all other bodies, both those in motion and even those among them that are immaterial. So that, if, of these, light is the most simple (for of the other elements fire is the least corporeal, but light less so than fire), it is clear that place should be light, the purest among all bodies. 'Accordingly,' he [Proclus] says, 'we should envisage two spheres, the one of light, the other consisting of many bodies, equal to each in bulk. Situate the one about the centre and put the other inside it, and you will see the whole universe within place, moving within the immobile light, being itself immobile as a whole, in imitation of place, but having moving parts, in order to be in that way inferior to place.' JOU

Cf. Proclus *in Remp.* 2.198,8ff., partly translated under **13(d)**.

(v) Certain daemons offer no resistance

(8) Porphyry *ap.* Proclum *in Tim.* 2.11,10-13

Hence Porphyry says that of daemons too those which have more fieriness in their composition, though visible, are not given to offering any physical resistance, while those which partake of earth too are accessible to touch. HT

(vi) Celestial spheres

These are immaterial, according to Themistius *in Cael.* 14,12-15, translated under **23(a)**. See on the heavenly spheres extending through each other to the centre of the universe, without being subject to ladelling, Simplicius *in Phys.* 531,3-9, Proclus *ap.* Simplicium *in Phys.* 613,14-20, translated under **20(d)**.

On the mutual interpenetration of the spheres, see also:

(9) Simplicius *in Phys.* 643,16-26

Nor is there anything marvellous if a less material (*aüloteron*) body be the place of a more material (*enuloteron*) body and be superior in its nature to the weaker, as the philosopher Proclus held. For the famous philosophers agree that the heavenly spheres are whole and full right to the centre. It is also clear that the interior spheres are in the exterior, as that of the moon is in that of Mercury and that in the sphere of Venus and so on. Moreover, sublunary elements, animals and plants are in all of them, even if they are more immediately in that of the moon, since they are more akin to it. So each of the more widely inclusive is a place to that which it contains as a container and receptacle for it and as determining its position. JOU

Simplicius adds to this the interpenetration of the empyrean and aetherial spheres postulated in the *Chaldaean Oracles.*

(10) Simplicius *in Phys.* 616,23-617,2

As for there being nothing paradoxical in a body pervading another body, an immaterial (*aülon*) one pervading either a material (*enulon*) or an immaterial one, one might accept it on the basis of Proclus' demonstrations, but mainly from divine doctrine, since it says that the empyrean pervades the aether, and the aetherial the material; and, since the intellective triads and hebdomads [see **8(e)**, Iamblichus *ap.* Proclum *in Tim.* 1.308,19-23] all have an originative role and, through this, have their domain in the empyrean, they proceed together with the universes, just as the empyrean pervades them all.

I find it repugnant that the spheres should be incomplete and be mere vaults, not complete spheres, if they did not penetrate to the centre. There will not be any connection between the centre and the circumference of each sphere, if it is not joined to it by something homogeneous. Also the worlds (*kosmoi*) will not be solids but hollow vaults. So what can the [Chaldaean] Oracles [fr. 57 Des Places] mean when they say:

The father formed seven firmaments (*stereômata*) of the worlds?

But if someone does not find this sufficient evidence that immaterial bodies pervade both each other and material bodies, let him examine on this point also him who says that place is body. JOU

Although Simplicius accepts immaterial, or less material, bodies being in the same

place, *in Phys.* 531,3-9; 616,23-617,2; 643,16-26; 966,5-12, translated in **20(d), (e)**, he raises a puzzle about which of the coinciding bodies the place belongs to.

(11) Simplicius *in Phys.* 623,32-624,2

But may I say jointly to those who say that place is a body and those who say that it is an extension (*diastêma*) that if it extends right to the centre then not only what are called immaterial (*aüila*) firmaments by those who do not know Greek but also all the celestial bodies of higher space, extending ever through that which is below, will be in the same portion of the extension of place, the empyrean body together with the aetherial and those of each of the heavens, and each of the generative elements, of fire or air, or water, or earth. If then we say that a place properly belongs to things in a place, to which of all these bodies shall we say that place properly belongs? JOU

Philoponus *Contra Proclum* 281,22-283,3, rejects the interpenetration of celestial spheres or any bodies whatever, partly on the basis of the sea in a cup objection (281,12-22), and partly because of empirical evidence.

(12) Philoponus *Contra Proclum* 281,22-282,14

Nor is it any more the case that it is impossible for this particular body to permeate that but possible for others to permeate another [body]. None of them can permeate any other, if even the heavenly bodies clearly do not permeate one another but are only in contact with one another. Not only are their bodies unable to permeate one another but neither can the light of the higher stars permeate the lower ones because the bodies of stars are not transparent. If their bodies had been equipped by nature to permeate one another, they would not eclipse one another, since the light within them would illuminate their entire interiors as well as their external shape. If, then, it is impossible for light to permeate them, it is yet more impossible for their bodies to permeate one another. For even though it has been proved that a hemisphere of the moon is always illuminated by the rays of the sun, the light that falls upon that hemisphere [of the moon] does not have the power to permeate its interior and illuminate its other hemisphere. MS

Reading
Richard Sorabji, *Matter, Space and Motion*, London & Ithaca, NY 1988, ch. 7.

20(f) What prevents interpenetration?

In these Neoplatonist discussions, various suggestions are made about what prevents bodies being in the same place.

(i) The number of qualities, or the quality of density (*puknotês*)?

(1) Plotinus 2.7 [37] 2 (30-42)

But if matter is itself bodiless, and not just matter but also the qualities, why should they not permeate bodies in the same way, if they are few enough in number? Solid (*sterea*) bodies cannot permeate others because they have the qualities which prevent that. Or else a large number of qualities together cannot do this along with the matter. So if the large number of qualities create what is called dense (*puknon*) body, the number would be the reason. But if density (*puknotês*) is a quality in its own right in the way that so-called corporeality is, then this will be the reason in its own right. Consequently they will not create the admixture *qua* qualities, but *qua* qualities of a certain kind; nor is it matter *qua* matter that will not mix, but matter in so far as it is together with a quality of a certain kind, especially since it has no size of its own but does not preclude size. BF

(ii) Matter?

This is the implication of the passages translated under **20(e)**.

(2) Syrianus *in Metaph.* 85,27-8, translated under **20(e)(ii)**

(3) Proclus *in Remp.* 2.162,24-8, translated under **20(e)(i)**

(4) Proclus *ap.* Simplicium *in Phys.* 612,1-35, translated under **20(e)(iv)**

(5) Simplicius *in Phys.* 531,3-9, translated under **20(d)(v)**

(6) Simplicius *in Phys.* 616,23-617,2, translated under **20(e)(vi)**

(7) Simplicius *in Phys.* 623,32-624,2, translated under **20(e)(vi)**

(8) Simplicius *in Phys.* 643,18-26, translated under **20(e)(vi)**

(9) Simplicius *in Phys.* 966,5-12, translated under **20(e)(i)**

It is also the implication of certain passages in Philoponus which allow immaterial extensions to coincide, since it is extension with matter that constitutes body.

(10) Philoponus *in Phys.* 559,9-18

So it is not extension (*diastêma*) simply, whatever kind of extension it may be, that is a cause of division, but extension with matter – that is, body. For matter is the cause of action and being acted on to the forms, those that are of such a nature as to act and be acted on at all. For not even the opposites will be acted on by each other if the cause of acting and being acted on is not in matter. (I am speaking of the natural, bodily affections.) So if the extension that forms place, being extended in three dimensions, is bodiless and matterless, it will not produce any effect in the body that occupies it,

nor will any effect be produced in it by the body, since only things that have the same matter produce effects on each other. So even if the void passes through the body there is no necessity that it divides it or is divided by it. DJF

(iii) *Per contra*: not matter

(11) Simplicius *in Phys.* 623,11-14 (precedes text translated in **15(a)**(1))

Also there is nothing absurd in two matters being coincident. For matter does not prevent mutual penetration. Nor is there anything absurd in two extensions coinciding if one is corporeal, the other empty, and one is a kind of space the other in the space. For it looks as if extension is spoken of in four senses. JOU

(iv) Extension? Ascribed to Aristotle

(12) Themistius *in Phys.* 133,31-134,31

Yet what will they say when a body is placed in a vacuum? Will the body withdraw for the equal volume (*onkos*) of vacuum? Isn't that ridiculous? Will it stay there? Isn't it incredible that an equal extension (*diastêma*) of vacuum will go right through the cube? If the vacuum is absolutely nothing, even we say no different, but if it has a nature of its own and is extended in three dimensions, how will it go through an expanse of the same kind? For that is as strange as if water and air did not make way for a stone cube, but went right through it. For what prevents [water, air and stone cube] going through each other and coming to be in the same place will not be the fact that they are hot, cold, light, heavy and endowed with other qualities, whereas vacuum is not, since it is bereft of all such qualities. It has already been said that being in place is a property of bodies only because they are extended (*diastêmata*), and even if they cannot be separated from other attributes, nonetheless the essence of their extendedness is something different. A stone has to occupy a place of such and such a size not because it is white or black, hot or cold, light or heavy, but because its extension is of that size. Through its weight it moves to this place, but when it is in a place, it is in it in virtue of its volume. For the size of its place will be determined only by this feature of the cube, not by its weight, or lightness, or any other of its qualities. So even if you postulated for the sake of argument that the stone cube was separated from all other attributes and consisted solely in its extension, it would still take up the same amount of room as it took up with its other qualities. So also in a vacuum it will take up the same amount of vacuum, whether it is thought of with its attributes or without them.

[134,22] How then in that case will the body of the cube differ from a vacuum and place of equal size? And if two such things can be in the same place, why not several, or infinitely many? See the point then by resuming

the necessity of the proof: if a body is in the [vacuum], an extension is in an extension, for the body will not withdraw from the vacuum and being in place is a property of body only because it is extended. But if an extension is in an extension, a body can also be in a body. For bodies are in places solely in virtue of their volumes, not in virtue of any other feature, and so if it is possible for a volume to be in a volume, a body will in no way be prevented from being in body, at least not by the other attributes. But it would be odd for a body to be in a body. So it is also impossible for a body to be in a vacuum. RRKS

(v) *Per contra*: not extension

(13) Philoponus *in Phys.* 560,33-561,3

Also, if extension (*diastêma*) is bodiless, nothing will prevent several bodiless extensions coming to be in one and the same body, since to the one, bodiless boundary of the body it is possible to apply the boundary of another body. DJF

(14) Philoponus *in Phys.* 561,3-12, translated under **17(g)**

(15) Simplicius *in Phys.* 623,11-14, translated under **20(f)(iii)**

Reading
Richard Sorabji, *Matter, Space and Motion*, London & Ithaca, NY 1988, ch. 7.

20(g) All bodies mixtures of elements?

Are all bodies, even the heavens, mixtures of elements? See under **23(a)** for the controversy on whether the heavens are a mixture of four elements or are made of a distinct fifth element. According to Aristotle, all (but only) bodies beneath the heavens are mixtures of the four elements.

(1) Aristotle *GC* 2.8, 334b30-335a9

All compound bodies, which exist round about the location of the centre, are composed out of all the simple bodies. For earth is present in all [of them] because each [of the simple bodies] exists especially and in greatest quantity in [its] appropriate place; and water [is so] because what is compound must be delimited, and of the simple bodies only water is very easy to give a shape to, and again even earth cannot endure without the fluid, but this is what holds it together – for if the fluid were removed from it completely it would fall to pieces. Earth and water then are present in [them] for these reasons, and air and fire [are so] because they are opposites of earth and water (for earth is opposite to air, and water to fire, so far as a substance *can* be opposite to a substance.) So since comings-to-be take place out of opposites, and from [each pair of] opposites one extreme

is present in [compounds], so must the other be, so that in every compound all the simple bodies will inhere. ARL

20(h) Growth differs from mixture

It is denied that growth is due to mixture by Aristotle *GC* 1.10, 327b13-15; Alexander *Mixt.* 234,4-9; Philoponus *in GC* 190,11-14. This is because in mixture all ingredients survive at least potentially, and all get larger, whereas in growth the incoming food perishes and cannot be said to expand.

Averroes, nonetheless, in the version translated by Kurland from Hebrew, Arabic and Latin, ascribes to Alexander the view that growth must be by way of mixture, *Middle Commentary on Aristotle's On Generation and Corruption, Corpus Commentariorum Averrois in Aristotelem* (*CCAA*), 3 vols, 4.1, text 38 *init.* ad 322a1. But this text acknowledges that it is giving only the gist of Alexander, and it contains the further inaccurate ascription to Alexander of the view that *matter* grows, contrary to Aristotle's insistence on *form*, *GC* 321b22-8; 32-4, to which Alexander is faithful. The medieval Latin version of Averroes' Arabic, ed. Fobes in a companion *CCAA* volume, omits all these features, except for a passing reference to food being admixed (*admixtus*, p. 49, line 46). It seems safe to discount the other version of Averroes' report. On this, and on the Aristotelian theory of growth more generally, see **Logic and Metaphysics 6(h)**.

21. Degrees of Latitude, Thresholds and Supervenience

Latitude (Greek *platos*, Latin *latitudo*) of forms was an important subject in the Middle Ages (see *Reading* below). But the suggestion taken over by medievalists has been that it started in medical circles, probably with Galen, with a subsequent passage from Philoponus also being noticed. In fact it is older than that. The name without the idea occurs in the early Stoics in their concept of a present or a location that has breadth, and in Galen's jurist contemporaries for a broad meaning of a legal term. The idea without the name is in Plato and Aristotle. It occurs, with or without the name, in commentators from the second to the sixth century, starting before Galen, and in at least six subjects: physics, logic, metaphysics, ethics, psychology and biology. Moreover, there are two importantly different applications of the idea, according to whether it is being said that, for example, black has a range (*platos*) of shades, or that the underlying blend of hot, cold, fluid and dry has a range of proportions which produces black only when the proportions reach a certain threshold. The second does not require black to admit degrees. The first idea is adumbrated in Aristotle's *Categories* and reflected in Galen, *On Blends* (*de Temperamentis*) 2.4, Kühn 1,609, Besslich 63,3-22. The second is in Aristotle's *On Sense Perception* and is reflected in Philoponus. It is sometimes the second that medieval philosophers (e.g. Thomas Wylton) need.

Reading

On the Middle Ages:

Marshall Claggett, *Nicole Oresme and the Medieval Geometry of Qualities of Motions*, Univ. of Wisconsin, Madison 1958, 36 n. 12 for Galen.

Pierre Duhem, *Le Système du Monde*, Paris 1956, vol. 7, ch. 5, section 4, 480-533.

E.D. Sylla, 'Medieval concepts of the latitude of Forms: the Oxford calculators', *Archives d'histoire doctrinale et littéraire du moyen âge* 40, 1973, 223-83.

J.-L. Solère, 'Plus ou moins: le vocabulaire de la latitude des formes', in J. Hamesse, Carlos Steel, eds, *L'élaboration du vocabulaire philosophique au moyen âge*, Turnhout 2000, 437-88.

Cecilia Trifogli, 'Thomas Wylton on motion', *Archiv für Geschichte der Philosophie* 77, 1995, 135-54.

On Antiquity:

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(i) Underlying latitude in discontinuous change

Aristotle sometimes holds that genuine change, that is, creation and destruction, or change of quality, quantity, or place, is not instantaneous but involves a process (*Phys.* 6.6, 237a17-b3; b9-21). But elsewhere, *Phys.* 1.3, 186a13-16; *On Sense Perception* 6, 447a1-3, he allows that qualitative change is different, and can occur in a discontinuous leap (see above **11(e)(i)**), as when a whole pond freezes over at once. Similarly, but for different reasons, with light (see **19(d)**). Light is merely the presence of fiery stuff in a transparent medium, or as commentators were to say is merely a relation (*skhesis*), see Alexander *in Sens.* 31,9-18, translated in **19(d)**), so it too, and the vision which depends on it, involves no process of anything reaching the viewer, *On Sense Perception* 6, 446b27-8; 447a8-11.

But how can changes of quality ever involve a continuous process, given Aristotle's view, *On Sense Perception* 6, 445b28-31; 446a16-20, that there is only a finite number of discriminable shades and pitches, and that variations smaller than this merely contribute to the perceptibility of a larger variation, 446a18? One answer is that a new shade can spread in a continuous movement across a leaf as it changes colour, *Phys.* 5.6, 230b32-231a1; 6.4, 234b10-20; 6.9, 240a19-29; 6.10, 240b21-31. I have suggested (*Time, Creation and the Continuum*, but see White's alternative) that another answer is offered by Aristotle in *On Sense Perception* 6. Although discriminable shades and pitches form a discontinuous series, they have a kind of derivative continuity (*to mê kath' hauto sunekhes*), 445b28. Aristotle seems to have in mind that the discontinuous change to the next discriminable pitch may be produced by the continuous change in tension of the vocal cords, and the discontinuous change to the next discriminable shade by the continuous change in the proportions of earth and fire in a body. Variations smaller than those between adjacent shades and pitches exist only potentially, and I have suggested that

'potentially' is to be understood here in terms of making a contribution to the total variation (*hoti en tôi holôi*, 446a18). The commentators seem to have missed this way of introducing continuity into qualitative changes.

Philoponus had a different suggestion as to how the instantaneous curdling of milk might accommodate a process (see Croese). The milk first acquires traces which are forerunners of the perfected form of being curdled (*hoion prodroma tina tou teleiou eidous ikhnê*), *in Phys.* 60,16-18.

(1) Aristotle *Sens.* 6, 446b29-447a3; 447a8-11

For it is understandable that movements should reach the intervening space first, and sound is thought to be a change of something in movement. But changes of quality are no longer like this, for it is possible to be changed in quality in one go (*athroon*), not half before whole. For example, water can freeze (*pêgnusthai*) all at once (*hama pan*) .... It is understandable, then, that things on the route to the sense organ are not all simultaneously affected, except, for the reason given, in the case of light, and, for the same reason, also in the case of vision, since light produces vision. RRKS

(2) Aristotle *Sens.* 6, 445b28-31

Rather, what is continuous divides into an infinite number of unequal parts, but into a finite number of equal ones, and what is continuous not in its own right (*to mê kath' hauto sunekhes*) divides into a finite number of species. So since qualities are spoken of as species, but in qualities continuity always inheres, it must be grasped that the potential and the actual are different. RRKS

(3) Aristotle *Sens.* 6, 446a16-20

When then, as many perceptibles are included as can be perceived in actuality, and not merely in virtue of being in the whole but separately, colours, flavours and sounds must be finite in number. RRKS

(4) Philoponus *in Phys.* 60,16-18

For even in the case when quality changes at one go there is a beginning in a different way, through the form, for example complete curdling, not arriving at one go together, but as it were forerunners (*prodroma*) of the complete form arriving as traces, I mean incomplete (*hupheimenai*) curdlings. RRKS

(ii) Latitude in logic and metaphysics

The idea of a latitude or range is also discussed in **Logic and Metaphysics**. Aristotle had insisted that people can differ from each other in being juster, healthier, more grammatical and so on, but reported a (Platonist?) view that one

justice is no more or less a justice than another; there are merely different degrees of *possessing* justice, *Cat.* 8, 10b26-11a5. Aristotle does not endorse the view, nor do the commentators treat it as his, but on this view as Simplicius puts it, it is not the justice, but the *participation* that has latitude (*platos*), Simplicius *in Cat.* 284,21. However, it is hard to distinguish degrees of possession from possessing degrees, and the commentators report up to four different views on the subject, Porphyry *in Cat.* 137,25-138,32, translated under **Logic and Metaphysics 3(l)**; Simplicius *in Cat.* 283,29-291,18; Boethius *in Cat.* 257B. The idea of degrees of participation was rejected by Plotinus *ap.* Simplicium *in Cat.* 284,12-17, cf. Plotinus 6.3 [44] 20 (39-42) and Iamblichus *ap.* Simplicium *in Cat.* 288,18-30, translated under **Logic and Metaphysics 3(l)**, as well as by the Stoics, who will be discussed shortly.

There are antecedents for this discussion in Plato. For one thing, we shall see that he makes Socrates insist that one soul cannot be more a soul than another; there are no degrees of being soul, *Phaedo* 93A-94A.

The Stoics take up another distinction from the same chapter of Aristotle's *Categories* 8, 8b27, and almost reverse its meaning. Aristotle had distinguished conditions (*diatheseis*) from states (*hexeis*), as being less persistent and stable. The Stoics distinguish conditions, e.g. virtues, as being in a different sense more stable, in that they do not admit of degrees, Simplicius *in Cat.* 237,25-238,2.

(5) Aristotle *Cat.* 8 10b26-11a5

Qualified things also admit of more and less, for one thing is called more or less white than another, and one more just than another. And a qualified thing on its own accepts increase, for what is white can become whiter – not in all cases, but in most, for one might raise a doubt whether one justice is called more justice than another, and similarly in the case of other dispositions. Some people dispute about such things. They say that one justice is not called more or less justice than another at all, nor one health than another. Rather, they say that one person is less in possession (*ekhein*) of health than another, and one less in possession of justice, and similarly also with grammatical knowledge and the other dispositions. All the same, at least what is described by these dispositions indisputably admits more and less, for one person is called more grammatical than another, or juster, or healthier, and similarly in the other cases. RRKS

(6) Simplicius *in Cat.* 284,12-285,8

There are four doctrines concerning greater and less intensity of qualities and qualified things.

[i] Some, for example Plotinus [cf. 6.3 [44] 20] and the other Platonists, declare that all qualities and qualified things admit more and less, because everything material (*enulon*) does so – matter has more and less because of its inherent indeterminacy.

[ii] There is another opinion over and against this which states that there is no more or less in the qualities themselves, such as justice and whiteness, since each is a whole and stands according to a single *logos* and

for that reason does not admit more and less; degrees of intensity are rather to be found in what participates, since participation involves latitude (*platos*), and some participate more, others less; that is why states themselves are thought to admit more and less, although it is the qualified thing that admits degree. Aristotle seems to hint at this opinion when he says [*Cat.* 10b30-1]:

'One might wonder if justice is said to be more so than justice', and later [10b33-11a5]: 'Justice is in no way more or less so than justice...but things that are spoken of as qualified by them indisputably admit more [and less]; for one man is said to be more literate, or more just, or more healthy, than another'. But when he says [11a1-2] 'so too with literacy and the other conditions (*diatheseis*)', he lumped together states and conditions [for different meanings, see Simplicius *in Cat.* 237,25-238,2, next passage], just as he did a little earlier with qualities and things qualified.

[iii] [284,32] The third doctrine is that of the Stoics, who distinguish the virtues from the intermediate skills, and deny that they can be more or less intense, while the intermediate skills do admit greater or less intensity. So according to them some states and qualified things do not admit greater or less intensity, while some admit both.

[iv] There is a fourth doctrine which says that immaterial and *per se* qualities do not admit more and less, while enmattered qualities and things qualified by them do. This doctrine differs from the former in that the former makes no distinction between immaterial and enmattered qualities. Porphyry objects to this doctrine as wrong to postulate immaterial qualities. He says: 'These are substances, and so, like other substances, do not admit greater or less intensity.' BF

(7) Simplicius *in Cat.* 237,25-238,4

It is also worth examining what the Stoics have to say about these terms. For some people believe that they hold an opinion which is the converse of Aristotle's (*Cat.* 8, 8b27), that condition (*diathesis*) is more stable than state (*hexis*). There is some basis for this belief, not because the difference between the two terms lies in being more or less stable, as the Stoics say, but because conditions differ; for they say that states can be more or less intense (*epiteinesthai, aniesthai*), but that conditions cannot be made more or less intense. That is why they say that the straightness of a rod, even if it is variable in that it can be bent, is a condition; for the straightness could not be relaxed or intensified nor could it admit the more or the less, so it is therefore a condition. In this way the virtues too are conditions, not because of some particular stable feature, but because they cannot be intensified and cannot admit the more. But the arts, although not easily got rid of, are not conditions. And the Stoics appear to consider state as consisting in the range (*platos*) of the form, condition in the form's completion and consummation. BF

(8) Simplicius *in Cat.* 287,12-24

If so, then there is something maximal and stable in each of the arts, for there is something entirely and maximally the case in everything that can be greater or less. So perhaps in the light of this consideration the doctrine which Aristotle alludes to, which allows perfect states in the case of health, literacy and other conditions, and not only in that of virtue, says that they themselves are not capable of intensification or relaxation (*anepitatoi, ananetoi*), considering that intensity or relaxation is to be found in the things that to greater or lesser degree partake in the states. But this can be seen not only in the arts themselves, but also in the virtues; for some of the virtues are perfect, others imperfect. The latter are those which are produced by only one of nature, habit or teaching, while the former are those which have been brought to perfection by these three things – except, of course, that virtue itself is perfect and complete, and is participated in a partial way like literacy and all the other arts; so the imperfect, the greater and the less are considered as residing in participation. BF

(iii) Latitude in ethics and psychology

The Stoics sometimes spoke of virtue as an all-or-nothing affair, admitting of no degrees. If you lack virtue, you are vicious, just as a man is drowning, whether he is an arm's length or five hundred fathoms below the surface (see the texts in Long and Sedley 60O, 61I, J, H, T, U). The greater interest, sometimes said to start with Panaetius, in progressing (*prokoptein*) towards virtue, leads Seneca to abandon this idea and say that someone progressing is already better than the wicked (*On the Happy Life* 17.3). The Stoics also admitted degrees in intermediate skills and qualities and their owners (examples: being protreptic, persuasive, good at spotting (*ankhinous*), Stobaeus 2.113,24-114,3 Wachsmuth), but denied that virtues or the virtuous could admit degrees (e.g. Simplicius *in Cat.* 284,32-285,1; Porphyry *in Cat.* 137,29-138,4). The term for admitting degrees is tightening and relaxing (*epitasis, anesis*) as of stringed instruments in Simplicius and Diogenes Laertius *Lives* 7.101; Stobaeus 1,113,24-114,3 Wachsmuth.

The Stoics also deny that emotions admit of intensification (*epitasis*), since the emotions are simply evaluative judgments. Intensification is found not in the emotions themselves, but in the accompanying sensed movements, known as bites, contractions and expansions, Plutarch *On Moral Virtue* 449F-450A.

The whole idea of tightening and loosening, as of musical strings, in the context of psychology and character goes back well before the Stoics at least to Plato. In *Phaedo* 93A-94A, Plato makes Socrates allow that virtuous character is an attunement (*harmonia*) like that of musical strings. But the soul cannot also be an attunement, *inter alia* because one soul cannot be more a soul than another, the very idea reported by Aristotle in *Categories* 10b26-11a4. Plato further uses the terms 'tighten' and 'loosen' of educating the irrational parts of the soul for virtue through music and gymnastics, *Republic* 412A1; 441E9-442A1.

Aristotle freely talks of people being more liberal or more courageous (*EN* 4.1, 1120b9-11; 3.8, 1117a18), although this may seem hard to square with his claim that in virtue there is only one point at which you can hit the mark, whereas there are many ways of missing it (*EN* 2.6, 1106b28-33, translated under **Psychology 17(b)**) and with his claim that there are no extremes in the mean, *EN* 2.6,

1107a18-27. Aspasius, though an Aristotelian, agrees with the Stoics that there are not degrees of virtue, and thinks that Aristotle may be describing as *less* virtuous those who are not really virtuous at all, *in EN* 99,29-100,4. He here considers, as does Simplicius, the alternative that it is imperfect virtues which admit of degrees, but both commentators (for Aspasius see 100,2-4) seem to reject this as a solution. Aspasius wonders if a virtue might be imperfect if one got some, but not all, aspects of one's action right. Simplicius, like the Middle Platonist Apuleius, *On the Doctrines of Plato* 2.6, raises the possibility of a virtue being imperfect because not based on all three of nature, habit and reasoning, *in Cat.* 287,19-24. But Simplicius is constrained by the objection that what is imperfect, according to the view he is currently discussing, is not the virtue, but participation in it.

Alexander uses the idea of latitude (*platos*) to say that the wise man's actions are not determined, since he has latitude as to the form his wise actions will take, *On Fate* 29, 199,30-200,2, translated under **Psychology 17(f)**.

(9) Aspasius *in EN* 99,31-100,4

In what sense did he say that the man who gives less is more liberal? Is it because the one is less and the other is more liberal? But if the one transgresses and does not give in accordance with his property, nor observe the right amount to give away, he is not a liberal man. So is there such a thing as remission and intensification (*anesis, epitasis*) in the case of the imperfect virtues? Let the argument be about liberality. What for example if someone gets everything precisely right by giving to the right people, at the right time, for the sake of the noble, and all the other things, except that he is deficient in respect of quantity? Rather, it is not the case that he said, 'more liberal' [Aristotle *EN* 4.1, 1120b9-11] in this sense, but he is in the habit of often describing things a certain way comparatively, when the one man is, but the other altogether is not; for example, calling the man who is deliberative 'more intelligent', and the man who is not 'less intelligent', when the one is intelligent, and the other is not. KI

(10) Alexander *On Fate* 29, 199,30-200,2

For however reasonable it is that the wise person (*phronimos*) should perform activities in accordance with reason and wisdom, first it is not in a definite way or by being carried out up to this particular point that these activities are rational and wise, but everything that happens in this way has a latitude (*platos*), and small variations in these matters do not frustrate the objective. RRKS

(iv) Latitude in physics

We have seen under **20** that Philoponus uses the idea of latitude (*platos*) to explain Aristotle's theory of chemical mixture, according to which ingredients are neither destroyed nor actually existent, but existent only potentially. Philoponus sees Aristotle as saying (although he disagrees) that the elements such as fire, as already allowed by Alexander *Quaest.* 1.6, escape destruction when tempered in the

mixture because elemental fire does not require maximal heat, but accommodates a range of hot temperatures, *in GC* 271,1-24, translated above.

Philoponus thinks that ranges of latitude also explain why the white of milk and the black of ebony do not interact. The range of proportions constituting milk is not compatible with that required for black. But the range of proportions constituting human flesh is compatible with those of a variety of colours, *in GC* 146,16-23.

Philoponus further cites latitude in a passage hailed by Sambursky as the first to articulate the functional dependence of one set of variable quantities on another, to explain why qualities like colour and flavour which depend on the proportion of the four elements in mixture do not all change simultaneously with each other as the proportions of the mixture change. Colours and flavours have different ranges of latitude, *in GC* 170,12-35.

In this context, Philoponus plays down the explanatory power of blends and of ranges of blends. Elsewhere he had said that psychological characteristics do not follow (*hepesthai*) from the blends of hot, cold, fluid and dry in our bodies, because we are psychologically capable of counteracting the blends by the use of philosophical reflection, *in DA* 51,13-52,1. Now when discussing non-psychological properties such as colour and flavour (*in GC* 169,4-27), Philoponus allows that they follow from a blend of earth, air, fire and water, *in GC* 169,17; 170,28. But colours and flavours are still not results explained (*apotelesmata*) by the blend, but merely supervene (*epigi[g]nesthai*) on the suitable character (*epitêdeiotês*) of the blend. There are two reasons why colours and flavours are not explained by a given blend. First, it would have to be the range rather than the particular proportion that explained the colour as opposed to the flavour. Secondly, not even the range explains, because matter alone without form cannot fully explain. Moreover, the colour-forms which supervene on the range of material proportions are (169,7-8) created by God, whose creation is called universal (*holê*), because, unlike lower demiurgic powers, he creates universal things in a universal way, according to Proclus *in Tim.* 1.310,15-24. See Jan Opsomer, 'Proclus on demiurgy and procession', in M.R. Wright, ed., *Essays on Plato's Timaeus*, London 2000, 113-43, at 119-23. Philoponus here approaches Avicenna's idea of God as giver of Forms: cf. *in Phys.* 98,35-99,1, 'the presiding nature that imposes (*epitithenai*) the forms', translated under **10(b)**. Philoponus seems closer to Avicenna than does Alexander, on whom see **1(b)**.

(11) Philoponus *in GC* 146,16-23

I mean something like this: there is a range (*platos*) of mixture within which human flesh can come to be; within this range the flesh sometimes comes out white, sometimes black, when some qualities are intensified or relaxed. This range of the mixture of flesh I call the common matter of the opposites which change into each other in human flesh. And the same applies in all cases. This is why every contrary does not change into every other, since the matter is not in fact common in the way described for the white that is in milk, say, and the black that is in ebony. CJFW

(12) Philoponus *in GC* 169,4-27

The same absurdity would seem to follow both for those like the doctors who say that forms are results explained (*apotelesmata*) by blends and for

those who say, as the correct account has it, that forms are not results explained by blends, but, coming from outside from the Demiurge's universal (*holê* [see above, narrative to **8(e)**(8)]) creation, supervene (*epigignesthai*) on the suitability (*epitêdeiotês*) of the blend. For if forms were results explained by blends, since what follows (*hepesthai*) that sort of proportion in the primary blend, I mean in the blend of dry with fluid, and hot with cold ingredients, is a number of qualities (such and such a colour, flavour, softness, hardness and the like), it is evidently clear that the thing will, in conformity with (*kata*) the same ratio, be sweet, red, fluid, hot and so on. Hence if all these [qualities] exist in conformity with the same ratio, a thing that is qualified by one will be qualified also by the remainder. Thus if it is active in conformity with one [quality], it will then be passive and active in conformity with the same thing, since it is in conformity with the same ratio that it is both [cf. Plotinus 6.1 [42] 20 (8-9)].

[169,17] But if forms are not results explained by blends, but, coming from outside, follow the suitability of blends, clearly the different qualities will have supervened on the blend in conformity with the same repeated suitability. But if different qualities have supervened in conformity with the same ratio of suitability, the same absurdity will follow again, if it is active by one quality and passive by another, since it will be passive and active in conformity with the same thing. Thus the same absurdity has followed from the true account as well.

[169,24] It is worth seeking then, and it would be an inquiry in its own right, in what way the different forms either result from the same blend, or, as the truer account has it, supervene on the same fitness, since it is clear in advance that the forms are not simply results of the blends. CJFW, RRKS

(13) Philoponus *in GC* 170,12-35

How, then, shall we reply to these points? Each quality is reckoned to be within a certain range (*platos*), and its being is not point-like. For whiteness exists within a range (for the moment something stops being ultra-white it is not the case that it is now no longer white at all), and similarly sweetness is reckoned to exist within a certain range (for the range of sweet things is extensive), and the same sort of thing obtains for them all. So if the qualities have a certain range, clearly the suitable blends (*kraseis*) in which it is their nature to inhere will have a certain range. However, there is some ultimate formula for a blend in which it is no longer its nature to inhere, but as soon as the blend reaches that point, the whole nature of the quality is altered. For instance, to put the argument to work by means of an example, let, say, ten parts of hot and an equivalent number of cold and of dry and fluid be the proportion in conformity with which it is the nature of the form of the most intense sweetness to inhere. If it is reduced by one part on one side of the balance, it will not be sweet to that degree, but it will not be the case that it is not sweet at all – rather that it is less sweet. If, however, it is reduced by five parts (let us suppose that sweetness is

retained up to this point) evidently the form will disappear lock, stock and barrel.

[170,28] So when different qualities follow (*hepesthai*) from the same blend, they will not all inhere in accordance with exactly the same formula as one another, but sweetness, say, will inhere in its perfect form, whilst whiteness or yellowness or viscosity will not 'inhere' in accordance with the perfect formula for themselves, but frequently in accordance with a less intense formula. So for this reason if the blend is modified a little, while the sweetness is not totally modified, the whiteness is often changed completely, since the original blend was near that particular and point-like blend in the presence of which this sort of colour no longer naturally occurs. CJFW

(14) Philoponus *in DA* 51,13-52,1

Hence the doctors have said that psychological capacities follow (*hepesthai*) the blends in the body. Against this the Attic commentators [used by Alexandrians, especially for the Athenian Neoplatonist commentators plus Alexander and Themistius – for a reference to earlier Aristotelians, see O. Immisch, *Philologus* 1904, 31-40] say that just as the doctors infer that the soul has the body as its substrate in which to inhere on the grounds that such and such psychological impulses follow the blends in the body, so we can establish the opposite result from the opposite premiss. For if the soul's inseparability from the body follows from its impulses following bodily blends, it will then be separable, if it does not follow these blends. Now we see that through philosophy even people with bad blends have not had corresponding impulses, but have overcome the blends. This would not have happened if their capacity had had the blend as a substrate in which to inhere. One cannot stop being pale, or sallow, or dark, which arises from (*ginesthai ek*) such and such a blend, even if one philosophises ten thousand times, until the blend is changed. Thus if such and such a psychological impulse happened as a result (*apotelesma*) of one's blend, it ought to have been quite impossible for a person to refrain from anger, if his blend was in the direction of anger and similarly for other cases. But as it is, that does not happen. So psychological impulses do not necessarily follow bodily blends. And the doctors themselves say this, for after saying that psychological capacities follow bodily blends, they add 'apart from philosophical ways of life (*diatribai*)'. So if philosophical ways of life can prevent psychological impulse following bodily blends, then there is something that is up to us, and they do not follow of necessity. And the being of impulses does not consist in the blend, for if it did, how would a philosophical way of life counteract emotions? From what would the truceless battle of reason and the passions arise? For nothing fights with the body that is its salvation, or strives to quarrel with its own cause. So if the blend were the cause of all psychological changes, it would never fight against itself. It is opposites that fight each other. RRKS

(15) Philoponus *in GC* 271,1-24, translated under **20(a)**

(v) Latitude in biology

Aristotle has the concept of latitude, but with the terminology of Plato *Philebus* 25C, 'the more and less', as a central feature of his biology. His nine main kinds of animal (fish, bird, etc.) differ from each other by analogy, gills being analogous to lungs. But within a kind, e.g. birds, *HA* 1.1, 486a23-b16, most differences are of the more and less (degrees of size, hardness, etc.). So the species are determinations of what remains indeterminate in the genus: the genus has a range. Even the species does, because individuals can differ by more and less, *Metaph.* 10.3, 1054b6; *EN* 8.1, 1155b11-15.

Reading
On more and less in biology:
James G. Lennox, 'Kinds, forms of kinds, and the more and the less in Aristotle's biology', in Allan Gotthelf, James G. Lennox, eds, *Philosophical Issues in Aristotle's Biology*, Cambridge 1987, ch. 13, 339-59.

(vi) Presocratics

We have seen that the concept of latitude of forms, if not the terminology, arises in physics, logic, metaphysics, ethics, psychology and biology and goes back as far as Plato and Aristotle. But Plato was influenced by the earlier concern of the Presocratic philosophers with degrees of qualities, which has been documented in G.E.R. Lloyd's *Polarity and Analogy*, Cambridge 1966, repr. Bristol 1987.

22. Dynamics

Aristotle saw the cosmos as spherical, with the earth stationary at the centre, surrounded by the other four elements, water, air and fire. Outside that again were the transparent spheres which carried sun, moon, planets and stars in rotation, and were made of a fifth element. The centre was the down point in the universe, the periphery was up. He fragmented dynamics into different theories. The natural motion of the four elements up and down depended chiefly on their inner nature; unnatural motion, such as that of projectiles, depended on an external force, but celestial rotation required a third type of explanation again. The use of impetus theory by Philoponus can be seen as attempting to restore more unity to dynamics.

22(a) Natural motion: internal cause?

Natural motion of the four elements up and down: is the cause wholly internal – inner nature – or does any external agent play a role? Aristotle in *Physics* 2.1, 192b13-23, distinguishes natural things from artefacts by saying that they have an internal cause of change, including movement, whereas artefacts have to be pushed or otherwise changed from the outside. But in *Physics* 8.4, in order to argue a need for God as an external mover of the heavens, he interprets Plato's principle that whatever is moved is moved by something as requiring an *external* mover. Thus although the main source of natural motion up and down for earth, air, fire and water is their internal natures, a role is also given to the agent who lets the earthy stone fall, or who by boiling water generates air which rises. The internal natures are sources of suffering motion passively (*paskhein*) at the hands of the external agents. Nonetheless, those agents are played down: the letter-go is only an incidental cause of motion (*kata sumbebêkos*), and Alexander and Philoponus exclude him altogether. The generator is cited by Alexander no longer as evidence of an external cause, but instead as evidence ('For', Alexander *Refutation of Galen* 67a below, Rescher-Marmura 17) that the cause is the internal constitution which he produces. Alexander is in controversy with Galen, who is said to deny the principle of Plato *Timaeus* 57E and Aristotle *Phys.* 7.1, 241b24, that whatever is in motion is moved by something, but Alexander nonetheless allows that the source by which a falling rock is moved is internal to the rock.

The Christian Philoponus gives a role to God, first that of giving to earth, air, fire and water their natural arrangement (*taxis*), as explained under **22(b)**, *in Phys.* 581,18-31. Later, in *Opif.* 28-9, translated below, he changes his mind and has God implant an impetus from the outside directly into earth, air, fire and water at the time of Creation.

(1) Alexander *Refutation of Galen's attack on 'everything that moves is moved by something'* 67a (Carullah *ms.* 1279), trans. Rescher-Marmura p. 17

He likewise made clear in the case of the bodies that move naturally

through the inclination within them that their source of motion is from the inclination existing in them by virtue of which they move naturally. For the thing that moves them from heaviness in potency to heaviness in actuality, making them be in a state differing from that they were in, is also the cause of their motion in actuality. R-M

(2) Philoponus *in Phys.* 195,24-32

How, then, do natural things differ from things that are not natural? Because those that are natural appear to have within themselves the origin (*arkhê*) of their motion and rest. For when they move, both animals and lifeless things have their mover within themselves, and are not moved by something from the outside. For example, when stones are let go, they are not moved downwards by the person who lets them go, for he merely let them go. It is rather the natural inclination (*phusikê rhopê*) in them that carries them down. In the same way too, fire that is let go from below is carried upwards by the nature (*phusis*) within it. Then, once they have been carried by the nature within them to join the main body of material to which they belong and to their proper places, they remain at rest. RRKS

Contrast his later appeal to divine impetus:

(3) Philoponus *in Phys.* 581,19-31, translated under **22(f)**

Reading

S.M. Cohen, 'Aristotle on elemental motion', *Phronesis* 39, 1994, 150-9.
David J. Furley, 'Self-movers', in G.E.R. Lloyd, G.E.L. Owen, eds, *Aristotle on Mind and the Senses. Proceedings of the 7th Symposium Aristotelicum*, Cambridge 1978, repr. in his *Cosmic Problems*, Cambridge 1989.
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P.K. Machamer, 'Aristotle on natural place and natural motion', *Isis* 69, 1978, 377-87.
J.E. McGuire, 'Philoponus on *Physics* II 1: *phusis*, *dunamis* and the motion of simple bodies', *Ancient Philosophy* 5, 1985, 241-67.
S. Pines, 'Omne quod movetur necesse est ab aliquo moveri: a refutation of Galen by Alexander of Aphrodisias and the theory of motion', *Isis* 52, 1961, 21-54.
G.A. Seeck, 'Leicht-schwer und der Unbewegte Beweger', in G.A. Seeck, ed., *Die Naturphilosophie des Aristoteles*, Wege der Forschung, vol. 225, Darmstadt 1975.
Friedrich Solmsen, *Aristotle's System of the Physical World: A Comparison with His Precedessors*, Ithaca, NY 1960.
Richard Sorabji, *Matter, Space and Motion*, London & Ithaca, NY 1988, ch. 13.
Michael Wolff, *Fallgesetz und Massebegriff*, Berlin 1971, ch. 3.
Michael Wolff, 'Philoponus and the rise of preclassical dynamics', in Richard Sorabji, ed., *Philoponus and the Rejection of Aristotelian Science*, London & Ithaca, NY 1987, 84-120.

22(b) Natural motion, natural place

(i) Aristotle's natural place

Aristotle explains the natural motion of the four elements not only by inner nature and external triggers but apparently also by reference to their natural destinations or places. His claim at *Physics* 4.1, 208b10-11, that place has power (*dunamis*) is merely part of a preliminary puzzle, so that it is disputed whether he endorses it. He will do so at most in the sense that it is in the nature of the four elements to seek to be in their natural places, presumably as final cause, as well as formal cause. See reading under **13(e)**, and for formal cause, see under **22(f)**. The Aristotelians, Theophrastus, Strato and Alexander may have de-emphasised natural place.

(ii) Is the idea of natural place attacked by Theophrastus?

See under **13(e)**. I have interpreted the report in Simplicius *in Phys.* 639,13-22 as concerned with natural place (but contrast Algra) and as replacing it with the idea that the elements seek to be in the right configuration in relation to other *elements*, like the parts of an organism. See the quotation there and additional reading.

Reading

Keimpe Algra, 'Place in context: on Theophrastus fr. 21 and 22', in W. Fortenbaugh, D. Gutas, eds, *Theophrastus: His Psychological, Doxographical and Scientific Writings*, Rutgers University Studies in Classical Humanities, vol. 5, New Brunswick 1992.

Keimpe Algra, *Concepts of Space in Greek Thought*, Leiden 1995, ch. 5.

Richard Sorabji, *Matter, Space and Motion*, London & Ithaca, NY 1988, ch. 12, 202-4; 213.

(iii) Natural place rejected by Strato

(1) Simplicius *in Cael.* 267,29-268,4

Both Strato and Epicurus after him were of this opinion, thinking all body has weight and is carried towards the middle and because the heavier lie beneath, the less heavy are squeezed out forcibly upward by them. So, if someone removed earth, water would go to the centre and if someone removed water, air would go to the centre and if air, fire. SB

(2) Simplicius *in Cael.* 269,4-6

One must realize that not only Strato and Epicurus said all bodies are heavy and bear down by nature and are borne up contrary to nature. SB

(iv) Natural place played down by Alexander?

This has been argued by Gannagé on the basis of the newly identified Arabic text of part of Alexander *in GC*.

Reading

Emma Gannagé, 'Alexandre d'Aphrodise *In De generatione et corruptione* apud Gâbir b. Ḥayyân, *K. al-Taṣrîf*, *Documenti e studi sulla tradizione filosofica medievale* 9, 1998, 35-86 at 60.

(v) Natural place attacked by Philoponus

Philoponus denies that elements are attracted to places, which for Aristotle are merely surfaces. Rather, like the parts of an organism, they seek to be in the right relation to other *parts*.

(3) Philoponus *in Phys.* 632,6-633,14

I reply to the present point that first and foremost there is no need for the place which receives each body to have any power (*dunamis*) or quality. The fact that it is good for each thing to be thus and so does not mean that any power need be stored in the place where it naturally resides. Aristotle himself would not say the fact that the celestial body is arranged in a circle and that this is good for it means that its circular place [reading *ton*] has power and that the celestial body is arranged in a circle, because it seeks (*ephietai*) this power. After all, he does not even think that the circular place [reading *ton*] is a place. So I deny that the celestial body occupies this part of the void or (better) of extension, that is, the extreme part at the circumference, because this part has some power. Rather it is because it is the nature of the heaven to embrace everything in its circumference and to contain everything within itself. Because this is its nature, then, it is to be expected that it occupies the corresponding part of space (*khôra*). So it is a result that happens not because of a power especially belonging to the extension (*diastêma*) [of the world]. The heaven occupies the outermost part of that extension, because this is its nature – I mean, to surround all things.

[632,20] It is like the case of the generation of animals: each different part is in contact with a different part of space, whether the latter be the boundary (*peras*) of the surroundings as Aristotle thinks, or an extension, as I think and reason shows. For example, the head is in contact with this part of the surface (*epiphaneia*) of the air, even if the air is not actually divided, and the hands and feet and so on are each in contact with a different part. Certainly, no one says that the boundary of the air in contact with the head, as distinct from that in contact with feet and hands, has a certain power, and that because of this, in search of (*ephesis*) that boundary, the head occupies this air-boundary and another part occupies another air-boundary. Rather, what is said is that the head's nature is to be on top of the rest of the body and that different parts of the body are differently arranged because this is good for the animal. It merely happens as a result of this that the head is in contact with this boundary and another part with another, although the air contains no differences in relation to itself. I say this also about the universe, for the cosmos is a great animal. Because it

was good for the arrangement of the whole cosmos that the bodies which fill it up should have this sort of relation to each other, and because each body for good reason has as its natural impulse (*hormê*) the search for this sort of relation to the others, and because it achieves this result when it occupies this part of the extension, for good reason each body seeks this result, not because that part of the extension has some power, but because good accrues to the universe and its identity and well-being to each part, when it goes beneath this part and on top of that. So it seeks a spatial extension not to obtain that extension, but to obtain a certain relationship to the other parts. RRKS

(4) Philoponus *in Phys.* 581,18-31

It is quite ridiculous to say that place has a certain power in its own right. For things move to their proper places not in search of a surface, but in search of the arrangement (*taxis*) they obtained from their Creator. So because earth was arranged at the bottom, so as to be beneath everything else, water in the second position, air and fire in the third and fourth, it is to be expected that, when something is dislodged from this arrangement, and what would naturally be on top of another thing is put by some force beneath it instead of on top, the things will move in search of the arrangement allotted by the Creator, far enough to be in that arrangement again. So light things move up, not because they seek simply to be in contact with the surface of their surroundings, but in search of the arrangement which the Creator assigned them. For then they most fully have their identity (*to einai*) and they have their perfection then. So place does not have any power to make bodies move to their proper places. It is rather that the bodies seek to preserve their arrangement. RRKS

(vi) Comparison with organism

Plutarch is like Philoponus and perhaps Theophrastus in seeing positions as due to a rational arrangement like that of parts in an organism. Cf. 927A-C.

(5) Plutarch *Face in the Moon* 928A-C

Indeed, the eye has its present position in the body not because it was squeezed out as a result of its lightness; and the heart did not slide down ending up in the chest as a result of its heaviness. In both cases the reason was that it was better to be located specifically in that position. It is similar with regard to the parts of the world. Let us not think either that the earth lies down here because it has fallen down due to its heaviness, or that the sun has been squeezed upwards to its high place like a balloon [an inflated skin] as a result of its lightness, as Metrodorus of Chios believed, or that the other stars got in their present positions because they moved there because of the difference in weight as would be the case with a balance. No,

it is the rational that prevails. The stars revolve like shining eyes stitched to the face of the universe; the sun, whose function corresponds to that of the heart, transmits and scatters out of itself heat and light as if it were blood and breath, the world uses earth and sea in a natural way as an organism uses the bowels and the bladder. The moon occupies the position in the middle between the sun and the earth, like the liver or another of the soft viscera between the heart and the intestines, and transmits hither the warmth from above and sends up the exhalations from down here while refining them in the area surrounding itself by a kind of concoction or purification. Whether its earthiness and solidity have any other use for the benefit of other things, that is not clear to us. However, in everything what is better has control over what is necessary. JO

Reading

Richard Sorabji, *Matter, Space and Motion*, London & Ithaca, NY 1988, ch. 12, 211-13.

22(c) The natural motions of the four elements

The Aristotelian Xenarchus questioned Aristotle's arguments for a fifth element to explain celestial rotation. Of his objections, recorded by Simplicius *in Cael.* between pages 11 and 56, two are translated under **23(a)**. The recorded objections focus on Aristotle's attempt in *On the Heavens* 1.2 to correlate the elements as simple bodies with simple movements, and so they bear also on the natural motions of the first four elements, earth, air, fire and water, which are supposed to be down towards earth, or up from it. Of the objections translated below, one assigns to fire a natural *rotation* and to the other three elements natural *rest*. The other objection is that fire could have two simple movements natural to it, one upwards and one circular, since water and air have two simple movements natural to them, one up and one down, towards their natural place. Xenarchus' arguments are repeated without acknowledgement by Plotinus 2.1 [40] 8, which Proclus interprets at his *in Tim.* 2.27, and by Philoponus *Contra Aristotelem*, as Simplicius explicitly complains, *in Cael.* 42,17-20 (= Philoponus fr. 18 Wildberg).

Reading

Andrea Falcon, *Corpi e movimenti: il De Caelo di Aristotele e la sua fortuna nel mondo antico*, Naples 2001.

R.J. Hankinson, 'Xenarchus, Alexander and Simplicius on simple motions, bodies and magnitudes', *Bulletin of the Institute of Classical Studies* 46, 2002-3,19-42.

James Wilberding, *Plotinus' Cosmology: A Study of Ennead II.1(40)*, PhD diss., University of Chicago 2003.

22(d) Motion in a vacuum

Aristotle's objections to motion in a vacuum and Philoponus' replies: Aristotle's fullest attack on the possibility of vacuum (for his other attacks, see **16**) consists in arguing that, so far from facilitating motion, vacuum would make motion impossible, *Phys.* 4.8.

(i) Would the lack of resistance result in infinite speed?

Would the lack of resistance result, as Aristotle threatens, in the absurdity of motion that took no time, i.e. in infinite speed?

No, says Philoponus, the rotation of the heavens is not infinitely fast, despite lack of resistance. (There is nothing outside the heavens to create friction, and any friction below the heavens affects only the elements there, not the celestial element.)

(1) Philoponus *in Phys.* 690,34-691,5

For if in general the reason why motion takes time were the physical [medium] that is cut through in the course of the motion, and for this reason things that moved through a vacuum would have to move without taking time because of there being nothing for them to cut through, this ought to happen all the more in the case of the fastest of all motions, I mean the [celestial] rotation. For what rotates does not cut through any physical [medium] either. But in fact this [timeless motion] does not happen: All rotation takes time, even without there being anything cut through in the motion. RRKS

What lack of resistance obviates is not the need for time, but the need for *extra* time spent in overcoming resistance. Philoponus' reply is approved by Galileo:

(2) Philoponus *in Phys.* 681,3-30

We shall now show in turn that the absurdities Aristotle thinks he derives as following from the proposition that there can be motion through void do not follow from it. For if bodies have their downward tendency from no other cause than their own innate impulses (*rhopai*), and from this cause the heavier body falls in less time, even if its motion takes place through a void; and further if the body through which things move when they do move through a bodily medium is an obstruction to their motion, then obviously the time taken by each motion is proportional to the impulses inherent in the [moving] bodies, even if there is no obstruction – I mean, no body through which the motion is taking place, such as air or water. For if the medium is a cause of unequal motion *qua* obstruction, then the innate impulses must be active causes. So even if the obstruction is removed, some time is taken by the motion of each thing – more or less of it in proportion to the greater or lesser impulse. But if some time is taken in the motion because of each of the impulses in itself, it will never come about that one and the same thing traverses in the same time an equal distance in the full and in the void.

[681,17] For if something traverses an extension a stade long filled with air, and the moving thing is not at one and the same instant at the beginning and the end of the stade, a certain time is taken because of the moving bodies in themselves (since, as I said, they are not at both ends at

the same instant), even if the extension is void, until they get from the beginning to the end; and a certain *other* (*allos*) time is taken because of the obstruction, since the pushing or parting of the medium makes the moving thing less mobile. So the more fine-grained we take the air through which it moves to be, the more the time taken for parting the air is diminished, and if the bodily medium is thinned to infinity, the time will also be diminished to infinity (for time is infinitely divisible); but it will never, even if the bodily medium is thinned to infinity, reach that time which it took to traverse a stade through a void. I will make the argument clearer by means of examples. If the moving body were a stone, and it moved through an extension of a stade, that extension being void, there will necessarily be some time that it takes in moving over the extension of a stade – say, an hour. DJF

(ii) Would everything fall at the same speed?

Philoponus replies to Aristotle's further objection, according to which everything would fall at the same speed in a vacuum. Not so, says Philoponus, for differences of weight would still have an effect, as Aristotle says they do in air, even though, *pace* Aristotle, only huge differences have a perceptible effect. Philoponus also thinks, *in GC*, that when small weights are tied into large bundles, the large bundle is somewhat heavier than the *analogia* of the parts. Whether that means what you would expect from the separate parts, or from the effect of the separate parts on air resistance, in either case the large bundle will fall somewhat faster than the parts. But, Philoponus objects, Aristotle's argument requires that for a given density of medium, speed of fall is in direct proportion to weight, whereas observation shows that doubled weight does not double speed of fall. There had evidently been experiments:

(3) Philoponus *in Phys.* 678,29-679,23

Furthermore, unless unequal bodies, in their own right, have the cause of unequal motion, even if they move not through a bodily medium but through a void, why is it that when a ton weight and a pound weight move through air, the ton falls faster? For if the air is homogeneous and the bodies in their own right are equally fast, what is the cause of their unequal motion? The air, being one and the same, should be the cause of the same effects. So it is clear that the impulses (*rhopai*) of the bodies, one of them being naturally more inclined to fall and the other less so, contain in that fact the difference in the unequal motion. For the one with a greater downward tendency parts [the medium] better.

[679,8] For what other reason can we give for the air being parted faster by the heavier, than that the one that has a greater heavy impulse has more downward tendency by its own nature, even if it is not moving through a bodily medium? Having more downward tendency, it pushes the air aside more effectively by the force (*bia*) of its onrush, and the air, being pushed more effectively, gets out of the way faster. Hence, if it cuts more

by having more downward tendency, even if what it cuts is nothing it will none the less have more downward tendency. For what has greater impulse does not have more downward tendency because it cuts more: it cuts more because it has more downward tendency. Moving does not follow from cutting, but cutting from moving, when motion takes place through a bodily medium. But if bodies in themselves have more or less downward tendency, they will obviously have such a difference among themselves even if they move in a void and the same distance in a void will be traversed in less time by the heavier and in more by the lighter, not because of being more or less obstructed, but because of having a greater or lesser downward tendency in proportion to the difference in their natural weight. DJF

(4) Philoponus *in Phys.* 683,23-4

Thus if the weights did not differ by a wide measure, but if one were, say, double, and the other half, the times will not differ at all from each other, or, if they do, it will be by an imperceptible amount, although the weights did not have that kind of difference between them, but differed in the ratio of two to one. DJF

(5) Philoponus *in GC* 199,21-7

Moreover, if the more the powers are collected together, the more intense they are and the more they exceed the proportion (*analogia*) of the parts, as is shown clearly in the case of weights (*rhopai*) (for when heavy things are divided they do not preserve the proportion of the whole – and this is most evident in the case of gold – but the parts are observed to be deficient in some degree in comparison with the weight of the whole. Similarly, when the parts are reassembled the whole is observed to be heavier than the ratio (*analogia*) of the parts [would require]. CJFW

(iii) Why would a projectile halt here, rather than there?

(Aristotle's objection unwittingly presupposes inertial movement independent of force.) Philoponus: it would halt when the force impressed on it was exhausted.

(6) Philoponus *in Phys.* 644,16-22

This [Aristotle *Phys.* 215a19ff.] is another argument to show that nothing moves contrary to nature in a vacuum. But I [Philoponus] say that just as you [Aristotle] make the thrust (*ôthêsis*) of the air responsible for movement contrary to nature, and say that the thing moves until the moving force (*kinetikê dunamis*) is spent that was impressed (*endotheisa*) in the air by the one who made the thrust in the first place, so clearly if something were moved contrary to nature upon a vacuum, it too would move until the

moving force weakened that was impressed on the thing by the one who made the thrust in the first place. RRKS

Reading
Richard Sorabji, *Matter, Space and Motion*, London & Ithaca, NY 1988, ch. 9.

(iv) What is the 'force of the vacuum'?

Philoponus asks why the avoidance of vacuum is commonly offered as explaining motion. Is the force of void simply the fact that there is space and it is never separated from substance? Sylvia Berryman has argued that the force of void is normally treated as the effect to be explained, not the explaining cause. Possible causes included push, drift and surface tension. This agrees with the modern view that it is atmospheric pressure which does the work in many cases, not the vacuum itself.

(7) Philoponus *in Phys.* 571,9-23

If then there were not within the clepsydra or the pipe of which we have spoken an extension distinct from the occupying body, void according to its own definition, whyever does nature either in the clepsydra prevent the water from moving with its natural motion when the upper mouth is blocked, or in the pipes make it travel upwards contrary to nature? The standard explanation says 'So that a void should not be created.' Well, what void was *going* to be created, my friend, if there is no extension between the edges of the vessel distinct from the extension of the water? It would follow that when the water has escaped, nothing but the hollow surface of the vessel is left. So what was going to become void? The surface? I don't think anyone in their right mind would say that the surface is full or void. For if surface, *qua* surface, is by its nature filled with body, what is the quantity – the volume, that is – of the air filling the surface of the earth? You won't be able to specify. What is the quantity of air filling the surface of this cube? DNS

(8) Philoponus *in Phys.* 572,2-6

If, then, place is a surface, and there is no extension void in its own definition, what is this power in nature which often moves bodies in the contrary-to-nature direction in order that void should not arise, supposing that the extension threatening to become void does not exist in the world? DNS

(9) Philoponus *in Phys.* 579,14-15

Perhaps this is the force of void – the fact that this kind of quantity [sc. space] is never separated from substance. DNS

Reading

Sylvia Berryman, '*Horror vacui* in the third century BC: when is a theory not a theory?', in Richard Sorabji, ed., *Aristotle and After*, *Bulletin of the Institute of Classical Studies* supp. vol. 67, 1997, 147-57.

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Pierre Duhem, *Le Système du Monde*, 10 vols, Paris 1913-59, see vol. 1, ch. 6 on Antiquity.

David J. Furley, *Two Studies in the Greek Atomists*, Princeton 1967, ch. 8 on Epicurus' response to Aristotle.

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David J. Furley, *The Greek Cosmologists*, Cambridge 1987.

Edward Grant, 'Aristotle, Philoponus, Avempace and Galileo's Pisan dynamics', *Centaurus* 11, 1965, 79-85, repr. in his *Studies in Medieval Science and Natural Philosophy*, London 1981.

Edward Grant, *Much Ado About Nothing*, Cambridge 1981, ch. 3.

Anneliese Maier, 'Ergebnisse der spätscholastiken Naturphilosophie', *Scholastik* 35, 1960, 161-87, translated into English in Steven D. Sargent, ed., *On the Threshold of Exact Science*, Philadelphia 1982.

E.A. Moody, 'Galileo and Avempace: the dynamics of the leaning tower experiment', *Journal of the History of Ideas* 12, 1951, 163-93; 375-422, abbreviated in P. P. Wiener and A. Noland, eds, *Roots of Scientific Thought*, New York 1957, 176-206.

S. Pines, 'Études sur Awhad al-Zaman Abu' l-Barakat al-Baghdadi', *Revue des Études Juives*, n.s. 3, 1938, repr. in his *Collected Works*, vol. 1, Jerusalem and Leiden 1979 (Avicenna is discussed at 52-6, same pagination in both places).

S. Pines, 'La dynamique d'Ibn Bajja', in *Mélanges Alexandre Koyré I*, Paris 1964, repr. in his *Collected Works*, vol. 2, Jerusalem and Leiden 1986.

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James A. Weisheipl, 'Motion in a void: Aquinas and Averroes', in A. Maurer, ed., *St Thomas Aquinas 1274-1974: Commemorative Studies*, Toronto 1974, vol. 1, 467-88, repr. in his *Nature and Motion in the Middle Ages*, Washington DC 1985.

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H.A. Wolfson, *Crescas' Critique of Aristotle*, Cambridge, MA 1929.

22(e) Celestial motion

Most Greek cosmology supposed that the heavens rotate around the earth. The minority Greek view that the earth rotates rather than the heavens is not represented in the commentators (but see **24**). Aristotle had explained celestial rotation both by the nature of the aether or fifth element which composes the heavens and which is capable only of rotation, *Cael.* 1.2, and psychologically by reference to celestial soul, *Cael.* 2.2, and eventually by the idea of the ensouled heavens being psychologically moved as if by love for the divine Intellect, which thereby becomes an unmoved mover, *Metaph.* 12.7. His successor Theophrastus, however, entertained the idea, considered by Aristotle himself in *Phys.* 8.5, that celestial soul, rather than divine Intellect, might be the prime mover, Theophrastus *Metaphysics*

7b15-23, and the next head Strato is said to have made all motion natural, in order to relieve God of work, in Cicero *Ac. Pr.* 2.38.121.

The heavens, according to *Metaph.* 12.8, consisted of up to 55 rotating transparent spheres, some of which carried the fixed stars, sun, moon and planets, and others of which corrected the motion of others, so as to produce the variations of motion that we see. On the standard interpretation, although it has been disputed, there are up to 55 intellects inspiring the spheres with love.

Christian disagreements on whether the heavens are ensouled are summarised by Thomas Aquinas, *Summa Theologiae* la.70. Origen and Jerome are said to make the stars conscious, Basil and John of Damascus to deny this, Augustine to be neutral.

(i) Alexander's modification of Aristotle

While Theophrastus raised questions about Aristotle's astronomy, Alexander tried to settle some of them. Although his commentary *in Cael.* is lost, we have Alexander(?) *Quaestiones* 1.25 and a work surviving in Arabic, ed., with French tr., by Badawi as *On the Principles of the Universe*, but now newly ed. with English translation by Genequand as *On the Cosmos*. For Alexander, the outermost transparent sphere, which carries the fixed stars around us, has a soul (*Quaest.* 1.1) and desires the unmoved mover by will (*boulêsis*), which is a function of Intellect (*On the Cosmos* 11; 13). Like everything else in the universe, the outermost sphere imitates, and seeks to become like (*homoiousthai*), the unmoved mover (*Quaest.* 1.25, 40,18-23; *Cosm.* 21-23). Regarding the inner spheres which carry the sun, moon and planets, each inner sphere has its own separate soul (*Cosm.* 96-7). But the number of inner spheres is reduced from up to 55 in Aristotle *Metaphysics* 12.8 to seven (*Quaest.* 1.25, 40,23-30). These seven spheres get their daily East to West movement from the outermost sphere, but their irregular movements in an opposite direction from the fact that they too desire an unmoved mover (*Quaest.* 1.25, 40,23-30; *Cosm.* 79; 94). As regards *Quaest.* 1.25, I follow Bodnar (*Phronesis* 1997) in thinking that discussion of the movement coming from the outermost sphere (the second movement) is postponed to the last two lines of 40,23-30, despite a confusing 'But' (*alla*) earlier at 40,27.

(1) Alexander(?) *Quaest.* 1.1, 3,10-14

And that which moves with the first among all movements is also animate; for the best of bodies is animate. Animate body is better than that which is inanimate, and the body that moves in a circle is the best [of bodies], and accordingly is also animate; for the best of all bodies is animate, and the body that moves in a circle is like this. RWS

(2) Alexander *On the Cosmos* 11 and 13

[11] It follows from what we have said that the desire which is in these is by will, and the true and excellent will is the love of the good. For will in an absolute sense is love of the good or of that which is thought to be good. ...[13] Desire in these things only exists in the intellect, for will in them does not exist by virtue of one of the passive faculties, because they have

absolutely none of these, but it is insofar as they perceive by their intellect that they desire the thing perceived by the intellect and represented. CG

(3) Alexander *On the Cosmos* 21-3

[21] For all things existing by nature have in the very nature appropriate to them an impulse towards the thing which is the First Cause and better than all things, since nature and all things existing by it do what they do according to the nature proper to them out of desire to imitate that thing from which they were generated primarily. [22] Each one of them achieves what it does according to its ability because of the perfection proper to itself in its very nature; thus, the natural body which is prior to all natural bodies has a natural impulse to imitate the First Cause. [23] The aim of the act of existing in the nature proper to it, namely the circular motion with which the [heavenly] body moves eternally insofar as it can, is an imitation of the substance which is not in a body and not moving; and the continuity of the motion appropriate to it is an assimilation to the eternity of that [First Cause] insofar as it is unmoved. CG

(4) Alexander(?) *Quaest.* 1.25, 40,8-23

And this, to express it briefly, is what the primary and incorporeal and unmoved and eternal being is like; and after it [is] the divine body that moves in a circle, being animate and being moved in respect of its soul. And since everything that is moved in respect of its soul is moved by desire for or aversion from something, and the body that moves in a circle is moved in respect of its soul in its movement in a circle, which alone of all movements is an eternal and continuous and even one, it is clear that this too will be moved by its desire for something for itself. But if every corporeal being is posterior to that body, it is not possible for it to be moved by desire for any of these. So it remains for it to be moved in its eternal rotation by desiring the primary eternal and unmoved being. Its desire is not to acquire it, but to become similar to it (*homoiousthai*) as far as possible; and it becomes similar to it in respect of its movement, by the eternity and uniformity and evenness of the movement. For rotation which always [continues] in the same place and in the same way is in a way like being at rest. Moreover the perfection which each of the things which become similar to it is able [to receive] is also itself in general a becoming similar to what is perfect, and the perfection of the body that moves in a circle is rotation of this sort. RWS

(5) Alexander *On the Principles of the Universe* from [Arabic] 268,12-18 Badawi (= *On the Cosmos* 96-7 Genequand)

We must assume that all spheres have souls, and each has a soul special to it, and that it is moved to perform the motion natural to it by a desire

special to its nature. For the nature of these things is their soul, since the form of a divine body is the most perfect of forms, and the souls of the divine bodies do not need the various divine bodies [*or* read: a variety of instrumental bodies] to [perform] the acts issuing from them. The first mover, as conceived by reason and desired, will move what moves towards it simply as a concept of reason – just as the object of love moves the lover – without moving itself. For it is not a body, and is devoid of matter and separate from it in all respects. RWis

(6) Alexander(?) *Quaest.* 1.25, 40,23-30

There are several spheres of the divine body and the first and outermost [sphere] is moved in a simple and single motion by desire for that being [i.e. the unmoved mover]. But the seven after it are, on the one hand, each of them moved [with a first motion] by striving for and desiring some (*tinos*) being of the sort by which that before them is moved. However, they are not only moved with this [first] motion. But [in this first motion] they are moved, each of them, of themselves in the motion in which each is moved and carried round in an opposite direction to that [outermost sphere], because it possesses this sort of position and ordering. But it is also moved in a *second* motion by the first [sphere], being carried round with the same motion as it. RWS

(7) Alexander *On the Principles of the Universe* from Arabic, 268,3-8 Badawi (= *On the Cosmos* 94 Genequand)

Let it be conceded, then, that the noblest of these things and the one most entitled to come first, is the mover of the sphere of the fixed stars; that through it [the sphere] it [the mover] moves the things that are moved by it; that next comes the mover of the second [reading: *al-thâniyya*, rather than the text's *al-thâbita*] sphere; that thereafter the third is the mover of the third sphere; and so on for the rest, so that the difference between one sphere and another in terms of the slowness and quickness of their circular motion, is caused solely by the difference of moving causes. We have described this difference in an earlier part of this treatise. RWis

(ii) How many intelligences inspire celestial motion?

Are Alexander's seven inner spheres moved by love for seven different unmoved movers? Aristotle's pupil Eudemus insisted that each sphere-motion involves its own mover that is not moved even incidentally (*ap.* Simplicium *in Phys.* 1262, 18-19). This at least sounds as if different spheres are moved by love for *different* unmoved movers, and Alexander may appear to agree. His *Cosm.* 94 requires different movers for different spheres, but Alexander(?) *Quaest.* 1.25, 40,23-30, requires only that the inner spheres desire some (*tinos*) being of the sort that moves the outermost sphere. Could the seven unmoved movers of the inner

spheres, then, after all be merely their souls, not seven separate objects loved by their souls?

At least four bits of evidence, none decisive, have been cited on this side (see Bodnar). First, Alexander is reported as wondering why all spheres should not love the same unmoved mover, *ap.* Simplicium *in Cael.* 270, 9-12. Secondly, Alexander is reported as arguing that souls which are spread through rotating bodies qualify as not being moved even incidentally, since the rotating bodies themselves do not as a whole change their place (*ap.* Simplicium *in Phys.* 1260, 22-35). Thirdly, Alexander is willing to admit after all that the souls in the inner spheres are moved incidentally, insofar as these spheres undergo a second movement which is produced not by (*hupo*) their souls, but, presumably, by the outermost sphere. But in this context, he is presented as thinking that the movement produced by their souls is produced by (*hupo*) unmoved entities, which, being within them (*en autois*), sound like souls. Moreover, he is presented as holding that the mover of the outermost sphere is a separated substance, to be contrasted with all other souls which are inseparable from bodies, *ap.* Simplicium *in Phys.* 1261,30-1262,4. Fourthly, in *On the Cosmos* 86, Alexander admits a distinct mover and desiring element in each sphere, but at the same time suggests, for a reason he may not eventually accept, that it is 'probably' wrong to admit a plurality of movers, presumably movers of another kind, and so perhaps movers acting as objects of love.

(8) Eudemus *ap.* Simplicium *in Phys.* 1262,18-19

Next he proved that the primary mover 'for each motion' (as Eudemus adds) must be unmoved both *per se* and incidentally, and must also be eternal as the cause of eternal motion. RMcK

(9) Alexander *ap.* Simplicium *in Cael.* 270, 9-12

On this Alexander raises a puzzle as to why the first mover, which is single, will not be able to move several rotating bodies, at least if it is going to move them through their desire for it as an object of love. For nothing prevents several things from striving after the same thing. RRKS

(10) Alexander *ap.* Simplicium *in Phys.* 1260, 21-31

For what is in circular motion is permanently 'in the same [place]' as it moves. 'And this', says Alexander, 'is the only possible way in which what causes motion can avoid being moved even incidentally – [namely,] if what is moved by it is permanently in the same [place] while it is being moved. For if such a mover is located in something that is a whole, and this whole is permanently in the same [place] (for the motion that belongs to what is in circular motion is motion in respect of [its] parts), what is located in [the whole] would no longer be moved by itself even incidentally. For the motion it causes in the body does not involve a change of the whole in which it is, as we saw take place in the case of mortal animals, which are moved by the soul by means of leverage, changing places in their entirety. For we will not

say that what causes motion is in any given part of what is in circular motion – why should it be in this part rather than another, when all of them are moved by it in a similar way? RMcK

(11) Alexander *ap.* Simplicium *in Phys.* 1261,30-1262,4

Alexander declares that the souls in the planetary spheres are moved incidentally – not by themselves but by the sphere that moves their bodies, because the bodies in which they are located do not undergo motion in the same direction as that in which they are moved by the unmoved elements (*ta akinêta*) in them. 'The first cause', he says, 'which is the motion-imparting element of the sphere of the fixed stars, will be moved incidentally neither by itself nor by anything else, because the sphere of the fixed stars undergoes but a single motion, in which the poles are permanently in the same [place], or because the origin is not the form of the moving body but some *separate* substance.' Alexander says this because he thinks that all the other souls are forms that are *not* separate from bodies. RMcK

(12) Alexander *On the Cosmos* 86

[86] But to assume a plurality of movers for the divine body, even though we may admit that each one of the spheres has a mover and a desiring element proper to it, is probably not a correct proposition; for if the moving causes are many, they must be specifically different from one another, since they cannot agree in species. CG

On the other side, pseudo-Alexander *in Metaph.* 707,1-6 clearly distinguishes the souls of the inner spheres from the gods which move them.

(13) pseudo-Alexander *in Metaph.* 707,1-6

[Aristotle *Metaph.* 12.8, 1074b15-16: 'The unmoved substances and principles can plausibly be taken to be as many [as the spheres].']

[Aristotle] does not therefore mean their souls, but other incorporeal substances separate from body, as inferior to the first intellect, if one must say this, as the other spheres are inferior to the sphere of fixed stars, but superior to the souls of the spheres. So the spheres are moved on the one hand by their own souls, as has been said, but on the other hand by gods of a kind like that involved when the sphere of fixed stars is moved by the first intellect. RRKS

(iii) Mechanics: Alexander and Neoplatonists

Alexander is presumably able to reduce the number of spheres from up to 55 down to seven, because by his time Aristotle's version of the theory had encountered a very serious objection, as explained by Alexander's teacher Sosigenes, *ap.* Simplicium *in Cael.* 504,17-506,3, and acknowledged by Alexander *ap.* Simplicium *in*

Cael. 32,1-11, both translated in **24**. The planets were seen to be closer at some times of the year than others, and so the spheres on which they rotated could not all revolve, in Aristotle's way, around the same centre. The existing solutions, as Alexander mentions, were the circles with centres off-centre from the earth, known as eccentrics, or the circles on circles known as epicycles, described in **24**. This permitted a smaller number of spheres, but how epicycles or eccentrics are accommodated in Alexander's system is unclear.

The Neoplatonists, while accepting epicycles or eccentrics, tended to make the system looser. It will be seen under **24** that Proclus asked whether the system had any mechanical reality, as Aristotle intended, or merely described the observed paths of the celestial bodies without explaining them. Philoponus reduces the extent of the mechanical explanation: the spheres, in his view, do not move each other, but they do move the epicycles.

(14) Philoponus *in Phys.* 892,4-23, cf. 839 (Venice excerpts on Aristotle *Phys.* 8.6)

Even in the heavens there are some things which change their place as a whole, e.g. the sun, moon and other heavenly bodies, so that it results that the unmoved causes within them also move accidentally. For this reason [Aristotle] defines the accidental, which occurs in two forms. One occurs when something moves itself accidentally, as when human souls move themselves by moving the bodies in which they reside. The other occurs when one thing is moved accidentally by another, which is appropriate for some celestial things. Thus the sun and the other heavenly bodies for their part move around their own axes without as a whole changing the place in which their bodies as a whole are stationed. But they are [also] carried round, with each heavenly body passing right through body, and occupy one place after another. They are carried round by the epicycle which itself moves around its own axis and is carried round together with the sphere. You can be sure that, in moving round its own axis, the epicycle moves in respect of its parts, and is carried round as a whole by the sphere in which it resides. Thus the souls in these bodies are also moved accidentally, by other things, not by themselves like created [souls]. But the sphere of the fixed stars and each of the other spheres [as opposed to the epicycles] are not moved by anything else.

[892,20] When we say that the unmoved things are in movement, we do not mean the intellects, for they do not take the body as a substratum to reside in, in such a way as to be moved accidentally along with it. We mean the incorporeal, but irrational, souls which take bodies as subjects to reside in. Intellect shines on body from outside. RRKS

(iv) The fifth element, fire, and natural vs. super-natural motion

Aristotle's belief that the heavens are composed of a fifth element with a natural capacity for rotation was attacked by Xenarchus, a member of Aristotle's own school, as explained in **23(a)**, even though accepted by Alexander. Xenarchus, it will be seen, seized on Aristotle's concession that fire in its natural place just below the

heavens rotates, and took Aristotle to concede that only there was fire fully actualised with its form. If, on these grounds, the natural motion of fire can be represented as rotation, or if alternatively, fire can have rotation as one of two natural motions (since water and air each have two natural motions, one up and one down) there is no need to explain rotation by a fifth element distinct from fire.

Philoponus made partial use of Xenarchus' objections, but, like some other late Neoplatonists, he saw the rotation of the spherical fire-sphere not as natural, but as super-natural. See **22(f)(v)**, with translations. Philoponus claims that similarly the heaven is itself moved by an incorporeal power super-natural vis-à-vis the body, but not vis-à-vis the soul of the heaven, *contra Proclum* 492,20-493,5. Compare Plotinus 2.1 [40] 3 (13-20) discussed by Wilberding.

(15) Philoponus *contra Proclum* 492,20-493,5

As the main body of fire does not revolve by a natural impulse, but is carried round together with the heaven that surrounds it, as you can be sure the water in machines is whirled round in a circle with the machines, and the circular movement of the fire-sphere is above its own nature (*huper phusin*), so too the heaven is revolved by a greater incorporeal power and gets movement of this kind above the nature of its body. So it will have no need on this account to be of a different substance, except that the heaven is immediately carried in a circle by the incorporeal nature, while what it surrounds is mediately so carried by it and that is how they enjoy circular movement. RRKS

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(v) Nature and soul both movers?

Alexander, Simplicius and Philoponus agree that the heavens are moved by both soul and nature. But soul and nature are identical according to Alexander, not Simplicius. For Simplicius' reasons for denying identity, see **1(d)(v)**.

(16) Alexander *ap.* Simplicium *in Cael.* 387,5-19

We should also comment on the passage that states [Aristotle *Cael.* 2.2, 284b33] 'in nothing inanimate (*apsukhon*) do we see anything from which motion originates', and on Alexander's comment that 'he will be calling the power to cause motion (*dunamis kinêtikê*) the origin of motion (*arkhê kinêseôs*). For even inanimate things have *some* origin of motion, supposing they are natural bodies, but they do not have the origin that causes motion or the power to cause motion *in themselves*, since what causes them to move

is external. But they do have a *passive* (*pathêtikê*) origin and power of being moved,' as if they have a nature (*phusis*) to be moved, not from their own efforts, but by something else, as he proved in the *Physics*. And so, if anyone investigates how nature causes the heaven to move and how the soul causes motion, it is wrong to answer with Alexander that in that case nature and soul (*psukhê*) are the same thing. How could they be the same if nature is a passive power of being moved, which is found in the subject that is moved, while the soul is an external [*exôthen*, Plato *Timaeus* 34B4; 36E3, more fully explained in **1(d)(v)**] cause of motion? Therefore we must not say that soul and nature are identical in the case of the heaven, and that it undergoes the same motion in virtue of both of them. Rather [we should say that it undergoes motion] in virtue of the soul as an external cause of motion, and in virtue of nature as an internal origin of being moved. RMcK

(17) Philoponus *contra Aristotelem ap.* Simplicium *in Cael.* 78,17-22 (fr. 49 Wildberg)

[Philoponus] shows by means of many arguments which, as he says, are in agreement with Plato, that the circular movement of the heavens is natural *and* imparted by a soul because the heavens are a living being (*zôion*), and although [he says this] in more [words] than are necessary, I [i.e. Simplicius] still think this is said correctly. CW

Philoponus provides an example to show how nature and soul can cooperate.

(18) Philoponus *contra Aristotelem ap.* Simplicium *in Cael.* 79,8-13 (fr. 49 Wildberg)

Then, having made the above accusations [against Aristotle] in these [arguments], he [Philoponus] says that it is not impossible for the same movement to be caused by a soul and by nature at the same time. 'For example, if one imagined,' he says, 'one of the birds making a straight flight towards the centre: the impulse (*hormê*) of the soul thus coincides with the natural inclination (*phusikê rhopê*) of the body.' CW

But later Philoponus has Christian afterthoughts, and says that celestial motion is not due to celestial soul after all, for the heavens have no soul.

(19) Philoponus *de Opificio Mundi* 6.2, 231,3-233,8 Reichardt

That there is no evidence, nor testimony of Holy Scripture, capable of showing that celestial things are ensouled, from which it is also demonstrated simultaneously that the angels were not brought into being together with the heaven and earth.

[231,7] If it was thought by some of our people that even celestial things

are ensouled and rational, first why is not any such thing said of them, not even that they have been generated in the image and likeness of the Creator? Secondly, their longevity is not evidence of this either, for adamant and many of the stones most precious among us are more long-lived and impervious than human bodies.

'The screaming crow lives nine generations of mortal men, the deer four crows, the raven three deer.' [Hesiod fr. 183 Rzach]

Yet elephants with all their size and strength and their being much more long-lived than humans, still submit to [humans] and become their servants. And that is why human nature is more valuable than anything and closer to God himself – because of its rational essence.

[231,24] Nor will anyone be able to show celestial things ensouled in order to make us agree that they also have rational soul. For if we distinguish the ensouled from the soulless by the activities of the soul, what activity of celestial things shows them to be ensouled? The natural movement of bodies, I mean of heavy and light ones, is distinguished, with some being borne up from below and others conversely down from above, and the movement in animals due to soul takes place according to their own conation and desire when appearances arouse the members which cause movement. That is why the movement is not always the same, but different at different times in relation to their desire and need. But in the case of celestial things, there is no evidence that their circular movement takes place according to choice (*kata proairesin*) of the soul. For the fire-sphere also moves in a circle and the air next to it, and that not by force, as we have shown elsewhere [cf. *in Phys.* 378,25; 384,19]. Nor is it to be attributed to their souls that things down here are moved by them. It is to be attributed only to the intermingling [*sunkrasis*, cf. Simplicius *in Cael.* 113,8] of the bodies themselves and the closeness or distance of our region.

[232,16] For why do the separation (*apostasis*) or convergence (*sunodos*, cf. Simplicius *in Cael.* 480,8-10; Philoponus *in DA* 325,38) of sun and moon and the entry of the planets into their zodiacal signs make changes in the air of our region? These are not the results of the soul's power, but only of the power corresponding to qualities. For the elements obviously act on our bodies, warming them and cooling them, and fire illuminates, for example sun, moon and stars, and the mere movement of bodies warms by rekindling the warmth in us and giving strength to the whole. As Hippocrates says,

'Movement strengthens, idleness softens [cf. *On Regimen* 2 Kühn I 696].'

[233,1] Even those frightened by astrology do not say it is the soul of celestial things that produces chance effects in our lives, but the beginning of our existence and the corresponding relation to each other of the planets and fixed stars, the patterns of these, and the position of each in some part, ascendant, sinking and mid-heaven, of the zodiac. RRKS

Rather, celestial motion, Philoponus now suggests, is due to an impetus impressed at the time of Creation by the Christian Creator-God:

(20) Philoponus *de Opificio Mundi* 28,20-29,9, translated under **22(f)**

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22(f) Impetus theory

(i) Impetus: an inner force impressed from without

An impetus is an inner force impressed into a moving body from without. It thus contrasts with purely external forces like the action of air on projectiles in Aristotle, and with purely internal forces like the nature of the elements in Aristotle and his followers. Internal forces are found in other schools too, e.g. the Stoics, and impetus theories would be very common if all these forces counted as impetus.

Impetus theories also contrast with theories of inertia which replaced them in the seventeenth to eighteenth centuries. Thomas Kuhn has seen the introduction of these two theories into dynamics as constituting scientific revolutions, although he was speaking about fourteenth century impetus theory, before it was fully recognised that impetus theory is found in Antiquity.

According to inertial theories, some motion needs no force to keep it in being. Thus, according to Newton, a body persists in the same state of rest or rectilinear motion *unless* there is a force acting on it to the contrary.

Such inertial ideas are merely sporadic in Antiquity and not consciously attended to as a separate option. Aristotle, for example, argues in *Phys.* 4.8 that in a vacuum a moving body would never stop, but the possible implications for inertia are not discussed. See **22(d)(iii)**.

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(ii) Impetus and accelerating fall

Possible earlier examples of impetus: Impetus and other explanations of acceleration of falling bodies.

22(f) Impetus theory

Hipparchus, the astronomer of the second century BC, may have explained the acceleration of falling bodies as due to the decline of an initial force opposing fall, impressed in the body by what threw it upwards, or detained it aloft.

(1) Simplicius *in Cael.* 264,25-265,9

Hipparchus in his monograph *On Things Moving Down Because of Weight* says that in the case of earth thrown upwards, the force (*iskhus*) which throws it up is the cause of the upward movement, so long as it dominates the force (*dunamis*) of what is being thrown. And the more it dominates, the quicker the body in motion travels upwards, but as it lessens, the body first no longer travels up so quickly, and finally travels down, using its own inclination (*rhopê*). The force (*dunamis*) which sent it up still remains in a way, but as it gets more worn [reading: *exitelou*], the falling body travels ever quicker and quickest when the force fails completely.

He gives the same explanation for things released from above. For them, the force (*dunamis*) of what detained them remains for a while and by counteracting, comes to serve as the cause of the released body travelling more slowly at first.

Alexander says, 'this is rightly said in the case of things moved by force, or by force detained in a place contrary to nature. But it no longer fits when said of things which, after being brought into being, travel of their own nature to their proper place.' RRKS

Alternative views of acceleration in falling bodies include the one ascribed to Aristotle (his own *Cael.* 1.8, 277a29-33 tells us little) that it is due to the form of earth getting perfected as it nears its destination. Alexander agrees, but Simplicius doubts the implication that the same body, weighed when aloft and when near the ground, would record different weights and wonders whether this acceleration happens at all. Another explanation of acceleration invoked the greater resistance of the larger body of intervening air to the fall of rocks from high up, or the rise of fire when low down.

(2) Simplicius *in Cael.* 264,22-5

Aristotle thinks that [elements] get more power from the main mass of their kind as they approach it, and get their form more perfect. RRKS

(3) Simplicius *in Cael.* 266,29-267,6, reporting Alexander

'A better and more natural cause of things moving faster when they get nearer their proper places,' says Alexander, 'is that stated by Aristotle – that their heaviness and lightness receive an increase. Aristotle would say that this happens because that which is approaching its proper place attains its form more and more purely, and consequently becomes heavier (if it happens to be heavy) or lighter (if it happens to be light).' But I think it is worth investigating first this very thing which is said to be agreed by

all, namely, how is it known that things move faster as they get nearer their proper places. And second, if an increase in heaviness or lightness occurs, it will follow that things that are weighed in the air, when someone leans out from a high tower or tree, or a sheer mountain ridge and weighs them in the air, appear heavier when he weighs them standing on the surface of the earth – and this seems fictitious, unless in these cases we say that the difference is imperceptible. RMcK

(4) Simplicius *in Cael.* 266,3-17

Not a small number of people declare that the cause of the fact that things that move downwards move faster the closer they are to the bottom is that when they are higher up they are supported by a greater amount of air underneath them, while when they come to be lower they are supported by less, and that heavier objects move faster because they divide the air underneath them more easily. Just as things that move downwards in water seem lighter when the water supports them and counteracts their downward motion, it is reasonable that objects in the air behave in the same way, and the more air there is underneath them, the lighter they seem, since they are being supported. Likewise too, a greater amount of fire moves upwards faster, since it divides the air above it more easily, and the more air there is above it, the slower the thing that moves through it goes. For even if air is not by nature like water, nevertheless, since it is a body it impedes the motion of things that move through it. But if this is true, the increase in speed does not occur because heaviness is added, as Aristotle says, but because the impediment is eliminated. RMcK

(iii) Proclus: God's impetus impressed on the cosmos

In a further example of impetus, Proclus, the target of Philoponus' *Against Proclus*, spoke of God giving the power of existing to the cosmos by bestowing this power in finite dollops such as the finite cosmos can accommodate. The same would presumably apply to God's bestowing movement.

(5) Proclus *in Tim.* 1.268,2-6, translated also under **8(d)**

Something else, then, will give (*didonai*) it the power of existing, and will give it not all at once, since it would not be capable of receiving it (*dektikon*) all at once. It will give it, then, in the amounts it can take (*lambanein*), in a stream that flows and ever flows on to it (*epirreon*). No wonder the cosmos is for ever coming into being and never has being. RRKS

Reading
S. Sambursky, *The Physical World of Late Antiquity*, London 1962, 76-89.

(iv) Aristotle on projectile motion: external force vs. impetus

As stated above, Aristotle split dynamics into unconnected areas. Celestial rotation eventually gets a psychological explanation, elemental movement is due chiefly to inner nature. But the theory of projectile motion was different again and unsatisfactory in a way that encouraged Philoponus to substitute impetus theory.

Aristotle's question was why a projectile continues to move after the hand of the thrower has come to rest. At *Phys.* 8.10, 267a2-12; *Cael.* 3.2, 301b23-30, I take it (but see Hussey) that he decides that the thrower imparts to the air the unexpected power of being a no-longer-moved-mover, unexpected because Aristotle is normally sparing in recognising unmoved movers. It is also difficult to explain why air sometimes assists and sometimes impedes movement. Philoponus substitutes the idea, nowhere formulated by Aristotle, that the thrower implants an *impetus* directly into the projectile. If it had been better to implant the force in the air (he asks), why does not an army of archers use 10,000 pairs of bellows? The relevant passage finishes by comparing impetus to the action of colour.

(6) Philoponus *in Phys.* 641,13-642,20

We must first ask those who state this [i.e. Aristotle's theory]: when one throws a stone by force (*biai*), is it by pushing the air behind the stone that he forces (*biazetai*) the stone into its unnatural (*para phusin*) motion? Or does the man who pushes transmit (*endidôsi*) some kinetic power (*dunamis kinêtikê*) to the stone itself? If he transmits no power to the stone, and it is only by pushing the air that he moves the stone, or the bowstring moves the arrow, what advantage was there in the stone's being in contact with the hand, or the bowstring with the notch in the arrow? It would have been possible, without touching these, to stand the arrow, for example, on the tip of a stick which would serve as a thin line, and similarly for the stone, and with ten thousand machines to set a great quantity of air in motion from behind. Clearly, the more air was set in motion, and the greater the force, it ought to push it more and shoot it further. But in fact, even if you were to stand the arrow or stone on a line that really lacked breadth or on a point, and were to set in motion all the air from behind with all your thrust (*rhumê*), the arrow would not move even the distance of a cubit. It is clear that it is not the air pushed by the hand or the bowstring that causes motion in the case of what is thrown or fired either. For why should this happen when the thrower is in contact with what is thrown more than when he is not?

[641,29] In addition, if what is in contact is continuously connected, the dart with the bowstring and the hand with the stone, and there is nothing in between, what would the air be that is moved from behind? And if it is the air from the sides that is moved, what has that to do with the thing thrown? For the air there falls short of it.

[642,3] From these and many other considerations, then, you can see that things moved by force cannot be moved in this way. Rather, some incorporeal kinetic power must be transmitted by the thrower to the thing thrown, and the air that is pushed contributes either nothing at all or very

little to this motion. And if things moved by force are moved in this way, it is surely clear that even if one propels an arrow or stone in a vacuum by force and contrary to its nature (*para phusin*), the same thing will happen all the more, and he will not need anything from outside to do the pushing.

[642,9] And surely this account, supported as it is by clear evidence (I mean the account according to which some incorporeal kinetic activity (*energeia kinêtikê*) is transmitted by the thrower to the thing thrown, so that the thrower has to be in contact with the thing thrown) – surely it will raise no more problems than Aristotle's opinion that certain activities come to the sight from the thing seen. For from colours too we see certain activities arriving in an incorporeal way and colouring solid bodies in their path, when a sunbeam strikes after passing through colours. This can be seen clearly, when a sunbeam strikes through a coloured glass: Wherever the sunbeam falls on a solid body by the way of the glass, it colours that body with the colour it passes through. So it is clear that certain activities pass in an incorporeal way from one thing to another in succession. RRKS

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(v) Rotation of the fire-sphere: natural, unnatural, super-natural?

Philoponus expanded his applications of impetus theory until they began to replace Aristotle's fragmented theories with a more unified theory. The next application was to the rotation of the sphere of fire which Aristotle believed to be positioned just below the revolving heavens. On the evidence of meteors and comets, Aristotle believed (*Cael.* 1.2; *Meteor.* 1.4; 1.7) that it too, like the heavens, moved in a circle. But this spoilt the simplicity of his system because fire now seemed to have two natural movements, circular and straight upwards, or, worse, an everlasting movement contrary to nature, dragged by the heavens. Xenarchus, the Aristotelian astronomer of the end of the first century BC, suggested that five could indeed have two natural movements, or alternatively that only the circular motion was natural, because fire does not yet have full being when it is still moving upwards to its natural place. The naturalness of rotation to fire means, according to Xenarchus *ap.* Simplicium *in Cael.* 21,33-22,17; 23,31-24,7, translated under **23(a)**, that the heavens need not be composed of something other than fire. The Neoplatonists, Philoponus and Simplicius, along with Olympiodorus *in Meteor.* 2.21, preferred to say that the circular movement was neither natural, nor contrary to nature, but above nature, super-natural (*huper phusin*).

Philoponus further speaks of an impetus impressed on the fire-sphere by the heavens and draws at 385,4ff. on Aristotle *Physics* 3.3, to say that it resides in the firebelt, so that the heavens suffer no reciprocal interaction. For this 'residing', he uses the Neoplatonist term *monê*, which had been applied by the Neoplatonists (see under **6(b)**) quite differently, to residing not in the product of causation but in the source.

(7) Philoponus *in Phys.* 198,12-16

Moreover the main masses (*holotêtes*) of the elements are unmoved. For fire does not move in its own place but only stands still, for its circular movement and moreover that of the proximate air are not natural but above [their] nature, through their being carried round by the rotation of the heavenly [spheres]. ARL

(8) Philoponus *in Phys.* 378,21-31

My reply to the first difficulty is that, in the first place, the discussion is now of natural changes, not of those that are from the soul, and it is impossible in the case of natural motions for what moves by the straight way also to move by the circular one. And if the fiery sphere and the continuum of air are moved together with the universe, yet this is not natural but super-natural, just as also the bodies of animals, being heavy by nature, are moved sideways by a change coming not from nature, but from the soul. It is therefore impossible for one and the same subject of a natural movement to suffer it both by the straight and the circular route. For it is impossible for fire to reach the upper place otherwise than by the straight way, and even then the origin and end of its motion must be perpendicular or parallel. ME

(9) Simplicius *in Cael.* 21,22-5

But it [the motion of the fire-sphere] must be something other than natural, as being [the motion] of a greater [body] which controls it. And perhaps it was for this reason that Aristotle did not say that it was possible for the [motion] of the other [lesser] to be unnatural, but rather forced (*biai*). For there is such a thing as beneficial force which is not contrary to nature (*para phusin*), but which would be called super-natural (*huper phusin*). RRKS

(10) Philoponus *in Phys.* 384,11-385,11

That is what Aristotle says, but someone may ask if the account which says that motion is only in the thing moved and not at all in the mover is true of every mover and thing moved. It is true in cases of growth or change of quality that what is moved is the patient not the agent, for what is whitened is not the whitening agent but the whitened subject, and what grows is not the agent of growth but the growing subject, that is, not the agent, but the patient. But in cases of change of place, in which some movers cause motion by being moved, the account will not be thought to fit. For if the heaven moves the sphere of fire beneath by being moved itself, how can I avoid saying that the mover is itself moved precisely in the process of causing motion? In that case, the movements will be two

different ones, that of the mover and that of the thing moved, and the movement of the heaven will be different from the movement undergone by things down here, as they are made to change their qualities in this way or that by the movement of the heaven. Thus the actualisations and the movements will be two different ones, differing not only in their definitions, but also in the subject in which they inhere. The fire-sphere will admittedly share in the motion of the mover, just as my cloak shares in my motion when I move, but as the heavens move round, the neighbouring matter all undergoes not only this motion, but also changes of quality. For just through the sun's changing its position, its change of place makes the things down here change their qualities in this way or that.

[384,29] To this objection I reply in brief that Aristotle does not deny that there are movers which cause motion by being moved. On the contrary, he says clearly that natural things are all such as to be incapable of causing motion except by being moved themselves. Aristotle's claim is rather about the kinetic power (*kinêtikê dunamis*) transmitted (*endidomenê*) by the mover to the thing moved, I mean that force (*iskhus*) and activity (*energeia*) by which a potentially moveable thing is moved, and brought to fulfilment (*teleioumenon*): it is one single force, but gets the origin of its coming forth (*arkhê proodou*) from the mover, and has its completion and perfection (*telos*, *apoteleutêsis*) and, so to speak, persistence (*monê*) in the thing moved. For when it has been generated in what is potential, it does not leave it alone, but persists (*menousa*), so to speak, and brings it to fulfilment, and the bringing forth of the potentiality (*tês dunameôs proagogê*) is its fulfilment (*teleiôsis*), and that is what motion is.

[385,4] An expert will project (*proballesthai*) his knowledge, even if there is no one to learn from him, but when his projection takes hold in a pupil and works its effect (*dran*) on him, I say that the efficacious power (*drastêrios dunamis*) by which the pupil is affected is one single power, and has its origin in the teacher, but is generated in the pupil, and moves him, and perfects the potential in him, and clearly is in the person moved, not in the mover, for the mover does not change in respect of this power. RRKS

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(vi) Philoponus: impetus extended across dynamics

In a late work, written as a Christian's interpretation of the Creation of the World, Philoponus explains most other cases of motion by God's impressing an impetus into the heavens, the four elements and animals.

Earlier he had accepted different explanations for these movements. His opponent, the theologian Theodore of Mopsuestia, is ridiculed for ascribing celestial movements instead to angels acting like baggage trundlers. Such forcible motion could in any case not last so long. For another example of Philoponus' humour on impetus theory, see *in Phys.* 641,13-642,20 above and *in DA* 51,13-52,1 under **Psychology 7(a)**.

(11) Philoponus *de Opificio Mundi* 28,20-29,9 Reichardt

Let the champions of Theodorus' view tell us by what divinely inspired text they have been taught that angels move the moon, the sun and each of the heavenly bodies, whether pulling them like yoked animals from in front, or pushing them on from behind like baggage trundlers, or both, or bearing them on their shoulders. What could be more ridiculous than this? Was God who created them unable to implant a motive power (*kinêtikên entheinai dunamin*) in the moon, the sun and the other heavenly bodies, as he implanted inclinations (*rhopai*) in heavy and light ones, and implanted in all animals the movements which come from the souls within them, so that the angels will not have to move them by force (*biai*)? For all that is moved otherwise than by nature has a movement that is forced and contrary to nature (*biaion, para phusin*), and will be caused to perish. How then could so many bodies of such a size last if they were forcibly dragged for so long? RRKS

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23. The Heavens

23(a) Composition of the heavens

Members of Aristotle's school raised doubts about his composing the heavens of an imperishable fifth element, aether, capable only of rotation, and lacking heat of its own, while producing heat only by friction.

Some preferred Plato's rival view, *Timaeus* 40A, which they took to be that the heavens are made of fire, or of the four elements with fire predominating. The view is refined, so as to include only the purest parts of the elements, the purest fire being identified with light.

Of the Aristotelians, Theophrastus is said to have accepted Aristotle's fifth element by the Aristotelian Xenarchus and the Platonist Taurus, who both rejected it. This is recorded by Julian *Orations* 8.3, 162a-c (FHS&G 158) and Philoponus *contra Proclum* 520,18-20 (FHS&G 161A). So Theophrastus may only have been raising puzzles in *de Igne* (*On Fire*) 4-6, translated below, when he envisages that the sun is hot and may be of fire. Yet he does seem to accept this, and among the Aristotelians, Strato *ap.* Stobaeum, translated below, made the heavens to be of fire and Xenarchus rejected Aristotle's view with many arguments, *ap.* Simplicium *in Cael.* 13-14; 20-6; 42; 50-1; 55-6.

One of Xenarchus' arguments, which Philoponus is accused of plagiarising, is particularly dramatic. In a single paragraph, *ap.* Simplicium *in Cael.* 21,33-22,17, Xenarchus assaults three central theses of Aristotle. First, the natural state of earth, water and air is not motion up or down, but rest. Secondly, the natural state of fire is not motion up, but rotation. Thirdly, it is therefore superfluous to postulate a fifth element, separate from fire, to do the work of celestial rotation. Xenarchus reaches these conclusions by exploiting two ideas of Aristotle. One is that each of the four elements only achieves its proper form when it has reached its natural place, Aristotle *Cael.* 4.3, 310a33-4, which Xenarchus takes to mean that until then it is not actually fire. The other idea is that Aristotle concedes that the sphere of fire immediately below the heavens rotates on the evidence of meteors and comets there, *Cael* 1.2; *Meteor.* 1.4; 1.7. Putting these together, Xenarchus concludes that *actual* earth, water and air rest, while *actual* fire rotates. As an alternative, Xenarchus objects, *ap.* Simplicium *in Cael.* 23,31-24,7, that fire could have *two* simple movements natural to it, one upwards and one circular, since water and air have two simple movements natural to them, one up and one down.

(i) Early Aristotelians' doubts about fifth element

(1) Theophrastus *de Igne* 4-6

This is what was also said by the ancients, that fire is always looking for nourishment, because it is not possible for it to persist without fuel. And for this reason it seems strange to call it primary and as it were a principle, if it is not able to exist without fuel. For in this way it is neither simple, nor prior to the substrate and the matter [i.e. fuel]; unless there is in the

first sphere itself some substance which is naturally heat which is pure and unmixed. But in that case it would no longer burn; and this [i.e. to burn] is the nature of fire – unless there is more than one different kind, and the primary sort is pure and unmixed while that located in the sphere of the earth is mixed and always in process of coming-to-be.

Does fire have its origin of coming-to-be from that [heavenly] type of fire or from the substrates when they are in a certain sort of movement and disposition in relation to one another, as we said just now, or from both? Well, such movement and change are themselves referred in a way to the nature of heat, for it is the sun that brings all these things about. And again, if the sun is some form of fire, this will differ very greatly [from terrestrial fire], being a principle and extending to all things (for light comes from it, as does the generative heat in animals and plants, and moreover it is possible for that of our earthy burning fire to come about through this; at any rate many people, when they light a fire, think that the brightness (*augê*) comes from the sun). If however the sun is not fire nor the light from fire, this on the one hand is strange and needs explanation.

But if on the other hand the heat is not brought about by the sun and on account of it, this point is clear, that both the fire and the heat are in some substrate. But this again is strange, if the principle and what is primary are in a substrate; for the hot and its power are a principle. RWS

(2) Strato *ap.* Stobaeum 1,200,21-2 Wachsmuth = Aëtius 2.11.4 Diels

Parmenides, Heraclitus, Strato, Zeno say that the heavens are fiery. RRKS

(3) Xenarchus *ap.* Simplicium *in Cael.* 21,33-22,17

Xenarchus, in his objections raised *Against the Fifth Substance*, after the one concerned with simple lines, raises a second difficulty against the natural motion of a simple body's being simple. 'For rectilinear motion', [Xenarchus] says, 'is natural to none of the four elements when they are actual, but only when they are coming to be so. Something which is coming to be is not unqualifiedly, but is between being and non-being, like a moving object: for this is between the place it aims at and that which it occupied before, and coming to be is akin to motion, since it too is a change.

[22,3] And for this reason we do not say that the fire which moves upwards is properly called fire, but is coming to be fire; and that when it has come to its proper place, and risen above everything else and come to rest, then it will have come to be fire properly. For it achieves its form, insofar as it is light, in this position. And earth is properly earth when it settles beneath everything else and occupies the central place.

[22,8] So too for water and air, water when it rises above the earth and settles beneath the air, and air when it rises above the water and settles

beneath the fire. So, he says, 'it is false that of a simple body there is a simple natural motion. For it has been shown that motion is a property not of that which is, but of that which is coming to be. Therefore if one must assign a motion to things that already are, and for it to be simple, one must assign them circular motion, given that these are the two simple motions, namely circular and rectilinear, while rectilinear motion is for the four [elements] when they are coming to be, not when they are, then one might without absurdity assign circular motion to fire, and rest to the other three.' RJH

(4) Xenarchus *ap.* Simplicium *in Cael.* 23,31-24,7

These are Xenarchus' words: 'perhaps, while there are two simple lines, the circular and the straight, each of the four [elements], earth, water, air, and fire, whenever they are, properly have natural rectilinear motion. But what is to prevent one, or some, or all of these basic subjects from being naturally inclined to move in a circle as well? For we have not indeed further assumed that there is a single natural [motion] for each.

[24,3] Indeed it would not be possible further to assume this, for it is self-evidently false, since each of the [elements] in the middle has two natural motions. For water moves naturally upwards from earth but the opposite from fire and air, while air moves downwards from fire and upwards from water.' RJH

(5) Philoponus *ap.* Simplicium *in Cael.* 42,20-2 = Philoponus *contra Aristotelem* (fr. 18 Wildberg)

A first objection whereby he [Philoponus] plagiarises the third [argument] of Xenarchus: 'Even if', he [Philoponus] says, 'the [body] moving in a circle may be primary, it does not follow that it is different from the four elements, as in fact rest and circular movement belong to these as well when they are complete (*teleios*).' CW

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R.W. Sharples, 'Theophrastus on the heavens', in *Aristoteles: Werk und Wirkung*, ed. J. Wiesner, Berlin 1985, vol. 1, 577-93.
R.W. Sharples, *Theophrastus. Physics*, Leiden 1998, fragments and commentary, 3.1, 88-94.

(ii) What type of fire Plato assigns to the heavens

(6) Philoponus *contra Aristotelem ap.* Simplicium *in Cael.* 84,15-22 (fr. 56 Wildberg)

'Plato', he [Philoponus] says, 'held that the heavenly bodies are not [composed] of fire alone, but that they partake above all of that sort of fire which produces a better mixture of the other elements. All the fine and purest substance of all elements,' he says, 'which also possesses the relation of form to the other [elements], has been chosen for the composition of the celestial bodies, while the more material and so to speak sludgy portion of these [elements] exists here below. This [i.e. the former] is the sort of fire Plato wants the stars and sun to be composed of.' CW

(7) Proclus *in Tim.* 2.8,20-5

Hence you could gather that all bodies participate in fire, but the fire is different for different things. For light is not the same thing as flame, nor flame as embers, but there is a scaling-down (*huphesis*) of fire between heaven and earth, proceeding from the more immaterial (*aülotera*), pure and non-bodily to the most material (*enulotata*) and densest (*pakhutata*) bodies. HT

(8) Proclus *in Tim.* 2.9,8-18

But perhaps that remarkable man Aristotle will challenge our account, claiming that not all that is visible is such by its participation in fire – that at least the troupe of the stars and the great sun itself are still visible even though they don't partake of fire. And if someone were to say to him that material (*enulon*) fire is one thing, while immaterial (*aülon*) [fire] is another (meaning that it is immaterial as compared with the matter of things beneath the moon), and the perishable [fire] is one thing and the imperishable [fire] is another, and that [fire] which is mixed with air is one thing and what is pure is another, and in general that there are many species of fire, perhaps he will concede the argument and listen to the theologians who call the sun a 'reservoir of fire', or a 'dispenser of fire', and all that sort of name. HT

(9) Proclus *in Tim.* 2.43,20-44,24

While this is the nature of the problems, it is better to affirm that the whole heaven is [formed] from a preponderance of fire, but it embraces also in a

preparatory way (*kat' aitian*) the properties of the other elements, for instance the solidity and stability of earth, the adhesive and unifying quality of water, the lightness and transparency of air. For just as the earth embraces everything in a terrestrial fashion, so does the heaven embrace everything in a fiery fashion. And so the single dominant principle encompasses everything else within itself in a preparatory fashion. One should consider that the fire there [in the heaven] likewise is not like our fire beneath the moon, but that it is divine fire, woven together with life and imitating intellective fire, whereas ours is in fact material (*enulon*), generated, and destructible.

[44,1] So the pure fire is in the heaven, and that is where fire as a whole is, but earth is present there in a preparatory way (*kat' aitian*), being another kind of earth, such as would be expected if it unites with the divine fire. It has solidity (*to stereon*) alone, just as the fire has luminosity, and just as that is not given to burning, so neither is the earth there something thick – of each there is the highest (*akrotatos*) kind.

[44,5] And just as the pure fire – what really is fire – is there, so too what really is earth and the fullness of earth is here; and fire is here by participation and in a material way (*hulikôs*), much as the earth is there in a causal way. The other is present in each of the two in an appropriate fashion, in one place the pinnacle (*akrotês*) of earth, in the other the dregs (*hupostathmê* [Plato *Phaedo* 109C]) of fire. The moon also is an indication, having a solid (*stereon*) and dark quality, and blocking out the light (for it is only in earth's nature to block out), and the stars which stand in the way of our attempts to see beyond, as if making a shadow above themselves. And it is clear that as these two are there on high, fire and earth, what are intermediate between them must also be there, transparent things to start with, air like the brightest here, and water like the lightest of vapours or something still purer than these, so that all things should be in all, and each in an appropriate fashion. For it is on account of this that we characterise fire by its visible quality, which is peculiar to all fire, and reasonably so: for just as earth is first and foremost tangible, so is fire [first and foremost] visible, because it needs none of the other elements in order to be seen (as the others need fire to be illuminating them so as to be seen), but it comes to be visible in and of itself, and this is the universal property of all fire. So the problem under investigation is solved. HT

(10) Simplicius *in Cael.* 85,7-15

Plato says that the heavens are made up mostly of fire (*ek pleistou puros*), because since, according to him, there are three kinds of fire – burning coal (*anthrax*), flame (*phlox*) and light (*phôs*) – they are principally (*malista*) made up of the purest (*katharôtatou*) and most luminous (*phôteinotatou*) of these kinds of fire, that is, of light. In fact, just as each of the elements called sublunary is composed of four simple elements which are genuinely elemental, but takes its essence, its character, and its name from the

predominance of just one of these elements (*kata tên tou henos epikrateian*), so too the heavens, which are composed of the superior grades of the four elements, take their essence (*ousiôtai*) from that supreme grade (*akrotês*) which predominates (*kata to kreitton tôn akrôn*). They are perfected, very luminous (*phôteinotatou*), and quite brilliant (*hololampês*), and that is why we honour them with the name Olympus. Ph Hof

(11) Simplicius *in Cael.* 66,33-67,5

This individual [Philoponus] now seems (*dokei*) to approve of Plato, who asserts that the heavens are made of fire, but he does not know what kind of fire Plato means. He does not realise that it is not the fire of the sublunary world (*touto*), the fire which Aristotle describes as rising upwards (and hence being light) and as floating above all rising bodies (and hence as being the lightest). Plato means rather that this sort of fire (*ekeino*), heavenly fire, is nothing other than light (*phôs*), for light is defined by him as a kind of fire. Ph Hof

Plato assigns fire to the heavens according also to Taurus, Porphyry, Plotinus, Proclus:

(12) Taurus *ap.* Philoponum *contra Proclum* 520,23-521,6

It is noteworthy how Plato's interpreter Taurus not only thinks it true that Plato said the heaven is composed of the four elements alone, but also opposes Theophrastus when he denies that the heaven is composed of these (Theophrastus was a member of Aristotle's sect), and that the interpreter of Plato does not think that the existence of the fifth element was accepted even by Aristotle. For he says: 'When he maintains that it exists, then let him respond to these objections'. AM

(13) Porphyry *ap.* Philoponum *contra Proclum* 521,25-522,23

Thus far Taurus. Porphyry too, in his commentaries on the *Timaeus*, interprets the passages of Plato mentioned above and has much to say about the world's consisting of the four elements alone. He also adds the following comment on the text: [522,2] 'To say, then, that the heavenly bodies are not composed of the four [elements] is not the view of one speaking in line with the doctrine that follows Plato but of one who follows his own doctrine, inasmuch as Plato says that even the heavenly bodies have come to be mostly from fire, with lesser portions of the purer and clearer [parts of the] other elements. According to Plato, then, the first two bodies are earth and fire, while the remaining bodies were provided for the sake of binding and linking [the first two]'. [522,9] And later, while commenting on the passage where Plato says 'And on account of these and from these, four in number, the body of the heaven came to be' [*Timaeus*

32B8-C1], the same Porphyry once again comments as follows on the text: '[Plato] mentions only the four bodies, since no other body besides these is found among beings, except for combinations of these'. Then, after a long argument to show that there is no other body besides the four, Porphyry once again cites Plato's statement with the comment: 'He clearly says that the world is composed of the four elements. Hence it is evident that he does not recognise the fifth body introduced by Aristotle and Archytas. Next we shall see this in detail'. Thus far Porphyry. AM

(14) Philoponus *contra Proclum* 524,19-526,3, quoting Plotinus

Where shall we place the great Plotinus, who, if anyone else did, thought of himself as a member of Plato's sect? He did not admit, even speaking in his own name, the fifth body that Aristotle intruded into the universe, of which Aristotle maintains that the heavenly bodies are composed. Speaking consistently with Plato's view, Plotinus too maintains that the heavenly body is composed of the four elements and makes it clear that this is the view of Plato. In his treatise on the world [Plotinus 2.1[40]], at any rate, he says the following:

[524,27] '[Plotinus 2.1 [40] 2 (5-12)] Although the nature of the body is always flowing in the same way [reading: *kaitoi rheousês*]. For this is the view of others who have spoken about nature and of Plato himself, not only about the other bodies but also about the heavenly bodies themselves. For how, he says, will they, being bodies and visible, have invariability and uniformity? [*Republic* 530B2-3] On this point too he clearly agrees with Heraclitus, who says that even the sun comes to be [DK 22 B 6, from Aristotle, *Meteor.* 2.2, 355a13-15]. AM

[525,8] [Plotinus 2.1 [40] 2 (12-16)] 'For Aristotle there would be no difficulty, in case anyone should accept his hypotheses of a fifth body. But for those who do not posit this, since the body of the heaven is composed of the same constituents as are living things here, how would [the celestial body] have particular thisness [*to tode*]?' RRKS

[525,12] And later on [Plotinus 2.1 [40] 6 (2-16)]: 'Timaeus, who made the body of the universe first of all out of earth and fire, in order that it would be visible because of the fire, but solid (*stereon*) because of the earth, thought it consistent to make the stars mostly but not entirely of fire, because the stars evidently have solidity. And perhaps this is right, as Plato too concurs on grounds of probability with this judgement [*Timaeus* 29B3-D3]. For from sense-perception according to sight and according to the apprehension of touch they appear to be mostly [reading: *pleion*] or entirely of fire, while if we investigate by way of reason, if solidity is impossible without earth, they would also be composed of earth. But why would they need water or air? It would seem absurd for there to be any water in so much fire; and if air were present in it, it would change into the nature of fire. But if two solid bodies [i.e. geometrical solids] standing in the relation

of extremes need two intermediates, one might raise the question whether this is also true for natural bodies.' AM

(iii) Philoponus' *contra Aristotelem*

This work, preserved chiefly in quotations in Simplicius *in Cael.*, is a dedicated attack on Aristotle's fifth element as is the earlier attack by Xenarchus. This work, to the horror of the devout pagan Simplicius, takes the Christian view that the heavens are not divine, and maintains that they are no different from the elemental mixtures down below, thereby, in Simplicius' view, misrepresenting Plato too. For although Plato does not postulate a fifth element, he does assign to the heavens a very special kind of fire.

(15) Philoponus *contra Aristotelem ap.* Simplicium *in Cael.* 88,28-34 (fr. 59 Wildberg)

But further, as [the Grammarian, Philoponus] does not scruple to blaspheme heaven outright – insanely rather – and evidently [blaspheme] God who had given and gives substance (*hupostêsantos kai huphistôntos theou*) to the heavens, he openly proclaims that the things in heaven do not [possess] any other nature than the elements in this world. 'For there is', he says, 'perhaps no [quality] observed in the things there that does not also belong to the terrestrial bodies.' CW

(16) Philoponus *contra Aristotelem ap.* Simplicium *in Cael.* 90,13-18 (fr. 60 Wildberg)

Due to his vain contentiousness it escaped [the Grammarian's] notice that even this David, whom he honours so much, teaches the contrary. For [David] discloses that he did not regard the things in heaven [to be] of the same nature as the things below the moon when he says that 'Heaven declares the glory of God and the firmament sheweth his handy-work' [Psalms 19.1 = 18.2 Septuagint], but not the 'fire-flies' and the 'scales of fish'. But also the saying of Aristotle fits here well, that 'if one absurdity has been granted the others follow' [*Phys.* 1.2, 185a11ff.; 1.3, 186a9ff.]. For how would someone who thinks that God is of the same nature as he himself hesitate to disrespect the most beautiful and noblest of God's creations? [The Grammarian] seems to conclude this argument in anger at those, as he says, who introduce for the celestial bodies a nature which is different from and alien to the elements, and which has nothing in common with them, and this even though all who are talked about in philosophy assume that the heavens [consist] of the four elements. CW

(iv) Harmonisation of Plato and Aristotle

According to Taurus, as Philoponus reports him in *contra Proclum* 520,23-521,6, and Simplicius *in Cael.* 85,31-86,7, Aristotle didn't mean aether to be a fifth

element. Simplicius says that Aristotle recognised the heavens to be a particularly pure mixture of the four elements with fire predominating, but speaks as if it were an extra element to emphasise its divinity, which Simplicius' Christian contemporaries denied. On the other hand, at 12,16-27, Simplicius seeks to harmonise Plato and Aristotle by the opposite tack of saying that Plato's associating the fifth of his regular solids with the heavens (*Timaeus* 55C) shows that Plato would not have minded speaking of a fifth element. This argument had earlier been used by Proclus *in Tim.*1. 6,29-7,2 ; 2. 49,29-50,2, but in a very different spirit. In his preface to *in Tim.*, Proclus tries to show that everything said by Aristotle had been anticipated by Plato.

(17) Taurus *ap.* Philoponum *contra Proclum* 520,23-521,6, translated under **23(a)(ii)**

(18) Proclus *in Tim.* 2.49,25-50,12

So the heaven is made of a fifth substance other than these [common or garden] four which are mixed together out of the simple [elements]. For what is in the heaven is not these, but their supreme grades (*akrotêtes*) and the four unmixed elements of all things which we separated from each other with their distinctive characters. RRKS

[49,29] And this is in very close agreement with Plato, who at this point affirms that the heaven is composed of the four elements bound together in proportion, and that the whole cosmos coheres, but a little bit later assembles the five shapes [regular solids] and calls them five *cosmoi*, for these give a fifth substance to the heavens, as well as introducing the *tetrachtys* of elements – in agreement with the truth too, for all things are in a fiery state there; hence the heaven is also a simple body and different from those here; but it embraces all of them, but things there are other than what are really material (*enuloi*), the masses (*onkoi*) of this world. Thus we shall agree neither that all earth is heavy nor that all fire is light, but what is beneath the moon is perhaps of that kind, but what is in heaven is so in a different fashion; for solidity and stability there come from earth (each of the spheres is not moved throughout its whole self), its light and mobility come from fire, its coherence and transparency come from air, and its evenness and smoothness from water. HT

(19) Proclus *in Tim.* 1. 6,29-7,2

[Aristotle sees] in harmony with Plato the distinctive properties of things distinguished by substance, and first among them the properties pertinent to the heaven, insofar as he makes the heaven to be ungenerated and of a fifth substance. For what is the difference between calling it a fifth element, or, as Plato called it [*Tim.* 55C-D] a fifth cosmos and fifth shape? RRKS

(20) Simplicius *in Cael.* 85,31-86,7

How can Aristotle appear to adopt a position contrary to Plato's where the

essence of the heavenly body is concerned, when he admits neither that it is composite nor that it is simple, like fire or any one of what we call the four elements? Doubtless he had foreseen the mad fury (*aponoia*), worthy of the giants, of those impious homunculi [sc. like the Christian Philoponus] who attack celestial beings; and since, for this reason, he wished the heavens to be conceived of as absolutely transcending the sublunary world, and as possessing a divine superiority to it, he refrained from using words which would tend to pull the heavens downwards (*kathelkein*), that is to say, towards any similarity (*homoiotêta*) with the sublunary elements. Ph Hof

(21) Simplicius *in Cael.* 12,16-27

Plato too seems to assign another substance to the heavens; for if he thinks that the five shapes of the five bodies are form-producing, and if he says that the totality was delineated, in respect of its being a determinate heaven, by the dodecahedron, which is something other than the pyramid, octahedron, icosahedron, and cube, it is clear that according to him it is distinct in respect of substance as well. And that Plato did indeed think that there were five simple bodies according to the five shapes was agreed by Xenocrates, his most eminent pupil, when he wrote the following in his Life of Plato: 'Thus he divided up living things, dividing them into forms and parts in every way, until he arrived at the five elements of living things, which he indeed thought to be the five shapes and bodies, namely aether, fire, water, earth, and air.' And so the dodecahedron was according to him the shape of the simple body of the heaven, which he called 'aether'. RJH

(v) Alexander defends Aristotle's fifth element

The heavens cannot be mixtures because they are matterless and mixture presupposes matter.

(22) Alexander *Mixt.* 229,3-9

Whenever the bodies that are unified are of the kind that have qualities by which constituents can reciprocally interact (for blending occurs among bodies that can reciprocally interact) then their blending also occurs. For this reason the whole divine body, which is active, is unmixed and unable to be reciprocally acted on by the body acted on by it; for only enmattered bodies can be acted on. Hence only where active bodies share in the same matter are they reciprocally acted on. RBT

(vi) Plotinus: the heavens are of pure fire, retaining only the *qualities* of other elements

Plotinus 2.1 [40] argues that the heavens are made of fire, not (2.1 [40] 2 (12-16)) the fifth element, but he thinks the fire takes only qualities from the other

elements, and is not mixed with them (2.1 [40] 7 (14-19)). Cf. 2.1 [40] 7 (19-28), translated at **19(b)**.

(23) Plotinus 2.1 [40] 2 (12-16)

For Aristotle there would be no difficulty, in case anyone should accept his hypothesis of a fifth body. But for those who do not posit this, since the body of the heaven is composed of the same constituents as are living things here, how would [the celestial body] have particular this-ness (*to tode*)? RRKS

(24) Plotinus 2.1 [40] 7 (10-19)

Earth is not mixed with the upper fire in the constitution (*sustasis*) of the stars, but since each has come to be in the cosmos, fire enjoys something of earth, just as earth does of fire, and each [element] of each, in such a way that what has had this enjoyment has not come to be out of both [elements], but out of itself and of [the qualities] it has taken a share of. In accordance with the community in the cosmos, it takes not the existing thing itself, but something of it, e.g. not air, but the softness of air, while earth takes the brightness of fire. The mixture supplies everything, this solidity and density, and then makes the combination, which is not merely earth plus the nature of fire. RRKS

Reading

Philippe Hoffmann, 'Simplicius' polemics', in Richard Sorabji, ed., *Philoponus and the Rejection of Aristotelian Science*, London & Ithaca, NY 1987.

Carlos Steel, 'Why should we prefer Plato's *Timaeus* to Aristotle's *Physics*? Proclus' critique of Aristotle's causal explanation of the physical world', in Robert Sharples, Anne Sheppard, eds, *Ancient Approaches to Plato's Timaeus, Bulletin of the Institute of Classical Studies* suppl. vol. 78, 2003, 175-87.

23(b) Heavens matterless?

Aristotle raises the possibility that the heavens have either no matter, or a matter capable of only one kind of change, viz. locomotion. Alexander, Themistius and Proclus agree, but not Philoponus *contra Aristotelem*, reported by Simplicius. Alexander(?) *Quaest.* 1.15 answers the objection that if the matter of the heavens is marked by a difference, that difference will make it a complex of matter and differentia, instead of being simple.

(1) Aristotle *Metaph.* 8.4, 1044b7-8

For perhaps some things do not have matter, or not matter of this kind, but only matter that changes its place. RRKS

(2) Alexander *Mixt.* 229,3-9, translated under **22(f)(v)**

(3) Alexander(?) *Quaest.* 1.10, 20,31-21,6

Or rather: If he said that matter was only the ultimate substrate which is receptive of opposites in turn, the substrate of the fifth body would not be included in matter. But if he also defines matter as follows, the ultimate substrate which in itself lacks shape, the substrate in the divine body too will be included in matter described in this way. For this account of the principle in the substrate is more general and includes both [types of] substrate in itself. RWS

(4) Alexander(?) *Quaest.* 1.15, 26,29-27,29

The matter in the divine things and in those subject to coming-to-be and passing-away is either the same or different. But if it is the same, [the heavens] too will be perishable, if at least those things which have that which is potentially as their substrate are perishable, as was shown by Aristotle both elsewhere and in particular in the first book of *On the Heavens*. If on the other hand it is different, it is clear that the matter which is the substrate of the things subject to coming-to-be and passing-away will be different from that which is the substrate of the divine. But if so, it will possess some difference from it; and then it would no longer be without quality or simple.

[27,4] Or rather: Not everything that differs from something differs by a difference, if difference in the strict sense is that by which a genus is divided into its proper species. At any rate what is not differs from what is, but not by possessing a difference; and neither, just because it differs from something, does it for that reason also come to be compound. Nor do things that are, just because they differ from one another according to the categories, therefore also differ by difference [in the strict sense], since the ten kinds [the categories] do not fall under a common genus. For it has been shown that being is not a genus.

[27,10] Moreover, many of the things that are differ, by not possessing something, from those that do possess it, as for example with not having hair or hands or something like that. For not possessing something, or having been deprived of it, is not a quality.

[27,12] Moreover, not every difference is a quality. For if a difference is that according to which the species from the same genus are mutually distinguished from one another, the difference in each species will be the difference of that of which it is [the difference] inasmuch as that which it indicates is the being of this thing. But in the case of all the things that are constituted by nature, which have not only their matter but also their form as their substance, the difference indicates some substance and not a quality, and the things that differ from one another according to such differences differ in substance, not in quality. Accordingly, since matter too is substance in the [composite] substance, through its being receptive of

opposites, the person who says that this matter differs in this respect from that will not be saying that it differs in quality.

[27,21] Since those who postulate that matter is receptive of opposites say that it is without quality, it is clear that they do not say that being receptive of opposites is a quality that it [has]. But if this is not a quality of matter, neither will those, who say that it is by possessing this that the matter which is the substrate for things subject to coming-to-be differs from the substrate of the divine, say that it differs in quality. For if what is receptive of opposites does possess quality in that it is like this, it will not be because what possesses this differs from what does not that it will be qualified, but because it possesses it in its own proper nature; and it is necessary for it to preserve this whether it differs from something (thereby) or not. RWS

(5) Alexander *in Metaph.* 22,2-3

The term 'substrate' (*to hupokeimenon* [*Metaph.* 1.3, 983a30]) has greater extension than the term 'matter' (*hulê*), for the substrate in the divine [bodies] is not matter. WED

(6) Alexander *in Metaph.* 169,17-19

He [Aristotle] adds 'perhaps' to the words, 'For the whole of nature has matter' [995a17], because the body that moves in a circle is also a natural body, but matter is not the substrate for this body. WED

(7) Alexander *in Metaph.* 375,37-376,4, cf. 'Alexander' *in Metaph.* 673,27ff.

In this connection one might inquire about the forms in the divine bodies, for these forms are neither enmattered (*enula*), nor perishable and are separable in thought from their underlying body. For the forms that impart motion [to the divine bodies] would be substances of the first order, since they are individual and ultimate and are not in anything. WED

(8) Themistius *in Cael.* 14,12-15

The body which rotates has no contrary, as will become clear in a little. Nor does it have any substratum, for elsewhere it was stated that it lacks matter. So the body that revolves exists without having been generated. RRKS

(9) Proclus *in Tim.* 2.50,3-5, translated under **23(a)(iv)**

(10) Philoponus *contra Aristotelem ap.* Simplicium *in Cael.* 133,21-9 (fr. 70 Wildberg), cf. Philoponus *ap.* Simplicium *in Phys.* 1331,20-5, translated under **23(c)**

At any rate, [the Grammarian] introduces two premises, one saying that the heavens are characterised by a natural form embedded in matter (*phusikôi eidei kai enulôi*[?]), and the other saying that something characterised by a natural form possesses an opposing privation (*sterêsis antikeimenê*). The latter premise, being false, he proffers as evident. The former, which says that the heavens are a natural form embedded in matter (*phusikon kai enulon eidos*), he attempts to prove by many [arguments], despite the fact that it is not really disputed, thus bringing matters of common agreement into dispute by superfluous reasoning. But perhaps nothing prevents [us] from looking at the things said by him in these [passages].

'It is quite ridiculous', he says, 'to say that the heavens are immaterial (*aülon*). For they are not intelligible, but perceptible.' CW

(11) Simplicius *in Cael.* 133,29-134,9

It is clear that those who call it immaterial (*aülon*) do not mean by 'immaterial' that it is an intelligible, but that it surpasses this matter which is involved in generation and destruction and receives or sheds forms. At any rate, Aristotle says in Book 8 of the *Metaphysics*, 'One must inquire in this way if one is going to inquire rightly about natural generated substances, since the causes are these and of this number and the causes must be known. But it is another story in the case of eternal natural substances. For perhaps some things do not have matter, or not matter of this kind, but only matter that changes its place.' Since he saw matter everywhere from the point of view of change, and in the heavens he recognised only change of place, it was plausible to leave only matter of this kind for the heavens. RRKS

Reading

Sylvia Fazzo, *La materia e il divino nelle Quaestiones di Alessandro di Afrodisia*, PhD diss., Turin 1997.

Lucas Siorvanes, *Proclus, Neoplatonic Philosophy and Science*, Edinburgh & New Haven, CT 1997, ch. 5, especially 273-8.

Richard Sorabji, *Matter, Space and Motion*, London & Ithaca, NY 1988, 41-2.

H.A. Wolfson, *Crescas' Critique of Aristotle*, Cambridge, MA 1929.

23(c) Eternity of the heavens

Philoponus' attack on eternity in the *contra Aristotelem* is resisted by Simplicius. Among the many arguments, the questions are canvassed whether celestial bodies are a composite of matter and form, whether they have the same matter as other bodies, whether they admit of contrary movements or qualities. For examples drawn from other works, see:

(1) Alexander(?) *Quaest.* 1.10; 1.15, 26,30-27,7, translated under **23(b)**

(2) Philoponus *ap.* Simplicium *in Phys.* 1331,20-5

And so, he says, if one took all the forms away, their three-dimensional [substrate] alone would remain in virtue of which the celestial bodies would not differ in anything from the bodies familiar to us (*ta par' hêmin sômata*), so that the things in heaven, being composites, can also decompose by definition and be destroyed. And because of this, their capacity is not infinite, even though according to Plato they are never destroyed because they are held together by a bond which is stronger than their own nature, the will of God. CW

Simplicius describes prime matter as indefinite extension, but denies that it is body (passages translated under **17(e)**). The new objection to making it body is the opposite of Alexander's response to a different point in *Quaest.* 1.15 that everything will become perishable. Rather, everything will become imperishable. But the correct view, that it is only prime matter that is indefinite extension, allows us to respect the perishability of what is below the heavens.

(3) Simplicius *in Phys.* 232,8-13

But how will these things be made to agree with the intention of Aristotle and Plato that matter be a certain underlying subject of contrariety? Well, on the one hand, perhaps the things said by the others concerning matter in fact reduce to body in the end. For there is nothing opposed to body. And in this way [i.e. if matter as indeterminate extension is identified with body] not only will heavenly body be ungenerated and indestructible, but also that below the moon. But on the other hand, the conception just now spoken of preserves the bodily extension of the things below the moon as [i.e. respects the fact that it is] generated and destroyed along with the extended form, such as man or horse. RB

Reading

Christian Wildberg, *Philoponus Against Aristotle on the Eternity of the World*, London & Ithaca, NY 1987.

23(d) How do the heavenly bodies give heat and light?

Since Aristotle's fifth element, unlike fire, lacks opposing qualities, he explains the heat and light of heavenly bodies at *On the Heavens* 2.7, 289b20-1, as due to friction set up in the fire-sphere beneath the rotating heavens.

But why is it not the heavenly spheres as a whole, rather than just the heavenly bodies carried by them, that give out heat and light? And why is there more heat and light in the day and at mid-day and in Summer and in valleys than on mountain tops?

Aristotle here ascribes celestial *light* as well as heat to friction, but does not go on to explain this. Simplicius refers instead to Aristotle *DA* 2.7, 418b11-13, where it is said that a transparent medium can be illuminated, that is made actually seeable-through, equally by fire and by what is like the divine (celestial) body, *in*

Cael. 442,4-12. As regards *heat*, Alexander argues that the heavenly bodies are more compressed than the spheres which carry them, 443,11-16, and the sun, being the largest and densest, creates most friction, 440,5-12, and is closer, 440,3-5. Simplicius replies that Aristotelians cannot allow to the heavens opposite qualities like rare and dense, which they believe to be causes of destruction, 444,6-8, and the sun is closest to mountain tops, 441,21-6, but in fact virtually equidistant at all times, 440,13-19. Nor could Aristotle's fifth element, which is exempt from pressure, transmit pressure to the fire-sphere, 440,29-441,2.

Simplicius' own view is that rays (*aktines*) from the sun, which, though corporeal, are in some sense immaterial, pass through the heavenly body without effect, but chafe and so compress and heat the air beneath, especially where the rays are redoubled by reflection. This redoubling happens especially at mid-day and in Summer, when the sun is near our zenith, because the rays are then closer together, 441,2-21, and more in the valleys, where the main reflection takes place, than on the mountain tops, 441,21-6.

(1) Simplicius *in Cael.* 442,4-12, reporting Alexander

Alexander notes that [Aristotle] proposed to speak about how heat and light both come from the stars when they are not fiery, and some people might think that the reason why he has spoken only about heat is that illumination of the transparent follows from heat and setting on fire. But this is not the way things are because not only fire illuminates, but so do certain other things, namely divine things themselves. Accordingly, he discusses light in the second book of *On the Soul* [2.7, 418b11-13] and says that light results from the action in the transparent of either fire or the divine body. Consequently the stars themselves can also produce illumination, even if they cannot heat, as he says elsewhere [*Meteorology* 1.3, 341a12-17]. IM

(2) Alexander *ap.* Simplicium *in Cael.* 443,11-16

It stands to reason that this body has a form, but this [form] would be rare and spoken of as open-textured, to which the opposite would be dense, and this form would admit more and less, and the spheres would be more open-textured, the stars less, since these seem to be more compressed. This compression does not change them in substance because this kind of rareness and density depends on the circular motion, and that is unchanging. IM

(3) Simplicius *in Cael.* 440,1-19, reporting Alexander

So to dissolve this objection, he [Aristotle *Meteor.* 1.3, 341a23-7] has added that the revolving heaven heats the underlying air 'especially there where the sun is implanted', and this is why more heat results in Summer when the sun gets nearer to our zenith and in the day when the sun 'rises up and is over us'.

[440,5] And Alexander says that it is not unreasonable that the heat

from the motion would be more and greater in that part of the underlying body which revolves as a unit, when the part is against a great body which is compressed and not very distant, since the contact with the motion in this part in a way involves more resistance because of the denseness and the magnitude [of the body]. So as a result the revolution of the heaven most heats the air in that part of it against which the sun is implanted.

[440,13] But it still seems to me the difficulty remains. Why does the sun, which is practically equidistant from us everywhere (since the air has to the sphere of the sun practically the ratio of a point and centre – parallax being very slight), heat the air around us more in Summer than in Winter, although its location is practically no less distant in Summer? And why does it heat more when it is in mid-heaven than when it is rising or setting, since it is at the same distance from what underlies it? IM

(4) Simplicius *in Cael.* 444,6-8, reporting Alexander

Fourth, how can [Alexander] envisage that rareness and density, which are opposites, are present in heavenly things, if he considers every opposition to be a cause of coming to be and destruction? IM

(5) Simplicius *in Cael.* 441,2-21

And so one should say that corporeal rays (*aktines*) emitted from the solar body move through the heavenly body to sublunary things and that, being immaterial, they traverse the heavenly body, as an immaterial thing, in an immaterial way without impediment, but that they no longer progress through the sublunary realm in this way because it involves matter. For [to make a comparison], certain souls receive the incorporeal radiations of heavenly bodies because their suitability to do so, but others do not receive them because their suitability is obstructed, and this is the way it is with sublunary things. Instead the radiations pass through air via its pores, and they are reflected back from solid objects at equal angles. So, when the air is taken hold of by them and moves along with them and is chafed in itself, it is heated up because of the compression, and this happens most of all in those regions in which the rays are reflected back at themselves and compress the intermediate air. And as a result the summer solstice is hotter, because, when it occurs, the sun does not simply come closer to us, since, as I have said, it is always practically equidistant from us, but because it gets closer to our zenith, it makes the rays, which are mostly at the meridian and near it, be reflected back upon themselves, and it causes the air which receives them to be compressed and ground together. But when the sun is in Winter or at rising or setting during the day, the rays which are sent in the direction of our location are no longer reflected back on themselves in the same way, but rather are more wide-mouthed and do not compress the air together in the same way. IM

According to Philoponus *in Meteor.*, the sun has real heat, contrary to Aristotle's view that it heats us by friction of its sphere. The latter is disproved by our experiencing no heat at night.

By contrast, the commentary *in DA* tries to support Aristotle's view that the sun, being made of the fifth element, lacks heat. But it mentions an even greater number of difficulties for the friction theory. The sun's ability to warm us is here attributed to its activity, viz. light, arousing the natural warmth of the air. This provides an example of sun as cause being unlike effect, the warmed air. Philoponus here agrees with Simplicius on the sun acting through the redoubling of reflected rays.

(6) Philoponus *in Meteor.* 49,22-34

So if the revolution of the sun were the cause of the heat in our region, still more heat would be given by the revolution of the sphere of fixed stars, or some other revolution (since it drives round with it the spheres beneath) as it stirred the air via the last of the spheres. But in that case, it would do the same also at night, since the movement of that sphere is one and the same and continuous. Since this does not happen, but the air is heated together with the sun, it is not therefore the movement of the sun nor that of the spheres that causes the heat, but the natural quality of the sun, which is all that is left, like that of fire.

[Aristotle] himself took what happens in our region as evidence of what happens there, and fire warms the air not by moving it, but only by the quality it has. So it is reasonable to think the same happens in the case of the sun and not to fight with appearances and with observation itself because Aristotle wants to save his own hypothesis that celestial things have no qualities. RRKS

(7) Philoponus *in DA* 332,5-22

How does the activity of something not hot heat us? And how would friction be produced by something incorporeal? I say to this that it is as when the soul which is not hot generates in the body a vital activity which stirs up the natural heat and brings an animal to life, whereas when the soul is absent, at once the natural heat is also extinguished. Similarly, I say light generates in the air a certain vital activity from the sun and this warms it through by stirring the air's natural heat. It is as when the aggressive (*thumoeidês*) capacity of the soul, which is not hot, is stirred: it warms the blood around the heart through, and similarly too thought, which is an incorporeal activity of the soul, warms [us]. It is plausibly in this way that the sun, which is not hot, warms the air through by stirring the heat in it by means of its vital activity which is light.

[332,17] If the activity produces warmth, where the activity is greater, the warming must be greater. So since in the case of reflections the activity is doubled and encloses (*periekhein*) the small amount of air within, the small amount of air is warmed not by friction, but by the increased activity, and the result is to be expected that there is combustion. RRKS

24. Scientific Astronomy

The programme for ancient scientific astronomy is said to have been set by Plato. On the almost universal hypothesis that the earth is stationary and the celestial bodies move around it, how are we to account for the appearance that the planets and sun and moon do not move in regular circles like the so-called fixed stars? It must be shown that the planets describe regular circles after all, Simplicius *in Cael.* 488,3-24, translated below.

Aristotle had the fixed stars carried round by an outermost transparent sphere. Inside that, each of the irregularly moving bodies, the sun, moon and planets (*planêtai*, literally wanderers) was carried round by a transparent sphere nested in a set of interacting transparent spheres so angled as to produce the appearance of irregular movement. Aristotle further had a counteracting sphere to undo the movements of one nest, so that the next nest in could start its movements afresh, in alignment only with those of the fixed stars. The system required up to 55 transparent spheres, *Metaphysics* 12.8. Other thinkers, but not Aristotle, substituted eccentric movements or epicycles, Simplicius *in Cael.* 32,1-29, translated below. Cf. 507,9-510,23, and Alexander quoting Geminus or Posidonius, *ap.* Simplicium *in Phys.* 292,15-20. An epicycle is a circle upon a circle. An eccentric relative to the earth is a circle around the earth whose (movable) centre is not the earth's centre. Proclus argues that the eccentric hypothesis and the epicyclic when fully generalised are equivalent, *Hypotyposes* 76,17ff., translated below, a fact first proved in a general form by Apollonius of Perga, *c.* 200 BC, and fully proved by Ptolemy (fl. between 146 and *c.* 170 AD) *Almagest* 3.3.

Aristotle's system of counteracting spheres failed, as explained by the Aristotelian Sosigenes, teacher of Alexander in the mid-second century AD, to account for the evident approach and retreat of the planets, or at least of Mars (A.C. Bowen) in relation to the earth during the year, Simplicius *in Cael.* 504,17-506,3, translated below. Epicycles and eccentrics were seen as more satisfactory in this regard, 507,9-14; Alexander *ap.* Simplicium *in Cael.* 32,1-29, translated below.

Nonetheless, questions were raised about the mechanical reality of all of these systems. Proclus asks whether the epicycles and eccentrics are merely human constructions, *Hypotyposes* 236,10-238,27, translated below. He regards them as fabrications, and further considers that it may be the celestial bodies themselves, not the spheres, which perform the actual movements, even though the movements display non-uniformity as well as order, *in Tim.* 3.56,12-57,6; 3.95,34-96,32, both translated below. Philoponus considers that, apart from the epicycles, other spheres move independently of each other, *in Phys.* 892,6-23, translated under **22(e)**.

There was a rival view that it is the earth that moves, either by spinning on its own axis, or by moving round the sun. Spinning is mentioned by Heracleides of Pontus, a member of Plato's Academy in the fourth century BC, and perhaps put by him into the mouth of a Pythagorean interlocutor Ecphantus in a dialogue. Rotating round the sun is suggested by Aristarchus of Samos, a pupil of the third head of the Aristotelian school in the third century BC, Strato. The locus classicus for Aristarchus is Archimedes *Sandreckoner* 1. Simplicius reports these ideas, *in Cael.* 444,33-445,3; 519,9-11; 541,27-9, but rejects them, 541,13-542,3, all translated below. One source explicitly says that Heracleides had thought only of spinning,

not of describing a circle, Aetius 3.13.3 in Diels, *Doxographi Graeci* 378. Heracleides also says that the planet Venus (and he has just given a similar treatment to Mercury) rotates around the sun on an epicycle, while the sun rotates around the earth, Calcidius *in Tim.* 110 Waszink 157, translated below. Rotation around the sun of *all* the planets, while the sun rotates around the earth (the system of Tycho Brahe) may have been postulated by the time of Apollonius in 200 BC. Proclus ascribes to Plato, on the basis of *Tim.* 39D-E, the view that the planets spin, e.g. *in Tim.* 3.96,3, translated below.

Reading

T.L. Heath, *Aristarchus of Samos*, Oxford 1913, part 1, chs 16; 18.
A.C. Bowen, 'La scienza del cielo nel periodo pretolomaico', in S. Petruciolli, ed., *Storia della scienza: La scienza greco-romana*, Rome 2001, 806-39.

(1) Simplicius *in Cael.* 488,3-24

Aristotle has provided a solution to the difficulty, while admitting the difficulty [the complexity of planetary motion] and agreeing that the planets move with motions which are many in form because they do not just apparently move forward, they also move backward and stand still, and they have different phases and retrogressions and progressions (*proêgêseis*, *akolouthêseis*) and all kinds of non-uniformities. In order to preserve these [apparent motions] the [astronomers] use many individual motions for each planet; some hypothesise eccentrics and epicycles, others homocentrics which are called counteracting [spheres]. The true account does not accept that they stand still or move backward, or that there is addition or subtraction in the numbers of their motion [i.e. that they change their speed], even if they appear to move in this way, nor does it admit hypotheses of this kind; rather it shows that the heavenly motions are simple, circular, uniform, and ordered, inferring this from the substance of the [heavenly bodies]. Not being able to grasp with accuracy how what occurs in the heavens is only the appearance of their condition and not the truth, the [astronomers] were content to find out on what hypotheses the phenomena concerning the [heavenly bodies] which are said to wander [i.e. the planets] could be preserved by means of uniform, ordered, circular motions. And, as Eudemus recorded in the second book of his astronomical history (and Sosigenes took this over from Eudemus) Eudoxus is said to be the first of the Hellenes to have made use of such hypotheses, Plato (as Sosigenes says) having set up this problem for those who had concerned themselves with these things: on what hypotheses of uniform and ordered motions could the phenomena concerning the motions of the planets be preserved? IM

(2) Simplicius *in Cael.* 32,1-29, reporting Philoponus' quotation of Alexander

In the eighth chapter [of his commentary on *de Caelo*] Alexander raises the

following objection. He says: 'If Aristotle says correctly that this motion which occurs around the centre of the universe is circular in the strict sense, then, those motions which do not occur around the centre of the universe are neither circular in the strict sense nor are they simple; and the heavenly bodies which have their own motion on spheres, in the way the astronomers think they do, move around centres unique to them and do not have the same centre as the universe, and the heavenly bodies themselves, their epicycles and – obviously – the so-called eccentric spheres do not move in a circle in the strict sense nor do they move simply, since downward and upward motion is also observed in them. And although these things are contrary to Aristotle's hypotheses, nevertheless the heavenly bodies are seen clearly to come nearer the earth and move further from it.'

[32,12] I say, then, that in this passage Aristotle only says this much: That circular motion is around a middle. For this is proper to every circular motion, but if elsewhere he says that the body which moves in a circle moves around the centre of the universe, one ought to realise that his discussion is based on the hypotheses of earlier astronomers. For the associates of Eudoxus and Callippus, and all the astronomers up to the time of Aristotle, hypothesised counteracting spheres homocentric with the universe and tried by means of them to preserve the phenomena; they said that all the spheres move around the centre of the universe, but they did not succeed in giving the causes for the apogees and perigees and the apparent forward and backward movements and the apparent non-uniformities in the motions of the planets in terms of these hypotheses. Because of this the associates of Hipparchus (and perhaps someone before him) and, after Hipparchus, Ptolemy hypothesised eccentric spheres and epicycles; and because of these hypotheses they gave up the [hypothesis] that all heavenly things move around the centre of the universe, and in terms of their own hypotheses they gave an account of the causes of the things we have mentioned earlier, causes which they received from those people. Accordingly, in this work *de Caelo* Aristotle says nothing about these matters, but in what he does say it is clear that he is following the earlier hypotheses. IM

(3) Proclus *Hypotyposes* 3.73, 76,17ff. Manitius

The eccentric hypothesis is the simpler of the two. And it can also be proved that if someone makes this hypothesis, the epicyclic hypothesis is satisfied indirectly, and, if the epicyclic hypothesis is made, the eccentric hypothesis is seen to be satisfied by the heavenly body indirectly. IM

(4) Simplicius *in Cael.* 504,17-506,3

[Sosigenes:] 'Indeed, the [hypotheses] of the associates of Eudoxus do not preserve the phenomena, not only those which were apprehended later, but

also those which had been known earlier and were accepted by them themselves. And what should one say about the other things, some of which Callippus of Cyzicus also tried to preserve when Eudoxus had not been able to do so? Did he preserve them? But this very thing, which is also manifest to sight, none of them until Autolycus of Pitane tried to establish through hypotheses (and even Autolycus himself was not able to establish it). This is made clear by his disagreement with Aristotheros. As I say, there are times when the planets appear closer, but there are times when they appear to have moved away from us. And in the case of some [planets] this is apparent to sight. For the heavenly body which is said to belong to Aphrodite [Venus] and also the one which is said to belong to Ares [Mars] appear many times larger when they are in the middle of their retrogressions so that on moonless nights the heavenly body of Aphrodite causes shadows to be cast by bodies; and also in the case of the moon it is apparent to sight that it is not always equally distant from us because it does not always appear to us to have an equal magnitude and the conditions under which it is observed are the same. And indeed the same thing is accepted by those who make observations in a more technical way because sometimes a seven-inch disk and sometimes an eight-inch disk [literally eleven-fingered, twelve-fingered], placed at an equal distance from the observer, blocks his vision so that [the moon] does not strike it. In addition to these things what occurs in the case of total eclipses of the sun provides evidence for what has been said and is evidence for the truth about this question. For when the centre of the sun and the centre of the moon and our eye happen to be in a straight line, what occurs does not always appear similar; but sometimes the sun itself is also contained by the cone containing the moon and having our eye as vertex, and then it remains invisible to us for a certain time; and sometimes it deviates from this by so much that there also remains at the temporal midpoint of the eclipse a kind of rim of the sun visible outside [the moon]. Consequently it would be necessary that the [heavenly bodies] appear to be different in size because of the inequalities of the distances (provided that atmospheric conditions are approximately the same).

[505,11] But what occurs in this case [of variations in distance] is also clear to sight, and it is likely that it also occurs to the other [planets] even if it is not manifest to sight; and it is not just likely, it is also true, since their motion each day appears non-uniform. But in the case of the apparent magnitudes [of these planets] there is no striking difference because their change in height and its opposite (which the mathematicians customarily call their motion in depth) also do not differ by much. Consequently [these people] did not try at all to preserve this [phenomenon], so that they did not show that the motion changes each day, although this problem is significant [reading *kaitoi tou problêmatos toutou axiou ontos*]. Indeed, it is possible to say that the inequality of the distances of each [planet] in relation to itself did not escape them. For Polemarchus of Cyzicus clearly recognises it, but on the grounds that it is not perceptible he ignores it

because he prefers that the position of the spheres themselves in the universe be around the middle itself. Aristotle also makes this clear in his *Physical Problems* [Aristotle fr. 211 Rose] when he introduces difficulties for the hypotheses of the astronomers on the basis of the fact that magnitudes of the planets do not appear equal. So he is not entirely satisfied with the counteracting spheres, even if he does propose that the spheres are homocentric with the universe and move about its centre [reading *autôi*].

[505,27. Heiberg finishes the quotation from Sosigenes here; Mueller continues it] And it is also evident from what he says in Book 12 [ch. 8, 1073b11-17] of the *Metaphysics* that he does not think that the facts concerning the motions of the planets are adequately described by the astronomers before and during his time. At least he says the following: 'In order to get some conception [about the number of the heavenly movements] we will state what some scientists say in order to have some definite number for our mind to take hold of, but as far as the other things are concerned it is necessary for us to investigate some ourselves and to learn others from those who investigate; and if some of those who pursue this subject think differently from what we say now, it is necessary for us to love both, but to believe the more accurate.' IM

(5) Proclus *Hypotyposes* 7.50-8, 236,10-238,27 Manitius

Let this be the end of our outline of astronomical hypotheses. I will finish the book by adding this much to what has been said. Those who are skilled in astronomy and eager to proclaim the motions of the heavens to be uniform fail to notice that they themselves proclaim the very substance of the heavens to be non-uniform and filled with affections. For what should we say about the eccentrics and the epicycles about which they chatter? Should we say that they are only thoughts or that they have real existence in the spheres in which they are fixed? For if they are only thoughts, these astronomers have overlooked that they have transformed them from natural bodies into mathematical ideas, and they adduce causes of natural motions on the basis of things that do not exist in nature. However, I will add that it would be strange if these things were moving. For it is not the case that because [these eccentrics and epicycles] are moved by our thought, the stars conceived to be on them move non-uniformly in truth. But if [the eccentrics and epicycles] also exist in reality [these astronomers] do away with the continuity of the very spheres in which the circles exist, since they make the spheres and circles move separately; and they make them move not in the same way as each other but in opposite directions; and they confuse their distances from one another since sometimes the motions are brought together and occur in a single plane and sometimes they are in separate planes and cut one another. So the heavenly bodies will have all kinds of dividings, combinings, and separatings.

[55,1] In addition to these things, the transmission of these contrived hypotheses is clearly haphazard. For why, [one could ask] in each case, does

the eccentric behave in this way (either remaining fixed or moving), the epicycle in that, with the heavenly body either retrogressing or progressing? And they never say what the causes are of those planes and distances – I mean the true causes, those which a soul which has been freed from all anguish sees most of all. But, actually proceeding backwards, they do not infer consequences from their hypotheses, as the other sciences do, but from the conclusions they try to fabricate the hypotheses from which it is necessary to prove the conclusions, and they obviously do not state all the hypotheses which it would be possible to work out in addition.

[58,1] However, it is necessary to realise this much: Of all hypotheses these are the simpler and the more appropriate to divine bodies; and they were conceived for the discovery of the nature of the motions of the heavenly bodies, which in fact move in just the way that they appear to, in order that the measure of the motions of the heavenly bodies become graspable. IM

(6) Proclus *in Tim.* 3.56,12-57,6

And since these planets have a motion which is one and continuous and uniform and unceasing, but their order and uniformity and unceasingness escape us because of their apparent forward and backward movements and stations, Plato says [*Timaeus* 38C] 'all having the name of "wanderers" (*planêtai*)'. You might infer from this that it is the heavenly bodies – and not the spheres in which the heavenly bodies move forward and backward – which undergo this [wandering] and movements upward and downward the [non-uniformities] which might be called the ordered paradigms assumed in advance of disordered things, that is, of the varied movements of sublunary things, movements upward, downward, forward, and back. For, as Plato said in the *Laws* [821B-822C], those who have the audacity to refer the wandering to the gods in heaven [the heavenly bodies] commit offence, not knowing the orderliness of [these gods] or their harmonious dance or the uniformity of their motions; for they appear to move non-uniformly only because of the motions and contrary motions of the counteracting [spheres], either because of epicycles and eccentrics or for some other reason. And these hypotheses are not probable: some depart from the simplicity of the gods, and others, fabricated by more recent people, suppose the motion of the heavens to come about as if by the action of a machine. And in the *Republic* [616C-E] when Plato makes the spindle weights and the seven circles in them homocentrics and refers only to these and not to epicycles, he seems to refer non-uniformity (and this the one having orderedness – since it returns to its own position in ordered times) to the heavenly bodies themselves as being intermediates between what moves completely uniformly and what moves completely non-uniformly; for they receive non-uniform motion in a uniform way and uniform motion in a non-uniform way. IM

(7) Proclus *in Tim.* 3.95,34-96,32

Since Plato says [*Timaeus* 39D-E] that the planets 'make turnings as they proceed through the heavens', we wish to know whether he thinks that their movement is multi-faceted, that they both move about their own centres and 'turn' in length, breadth, and depth throughout the heavens, that is throughout their own spheres, which are the parts of the heaven and fill the whole of it. For Plato does not say that the planets move *in* the heavens, as if they retained their place, but *through* the heavens, on the grounds that they move through their orbits and change place as wholes in addition to always moving around their own centres, so that they have a certain mixed motion, just as they are intermediates between the fixed stars, which always occupy the same place, and sublunary things, which do not move around any centre. So, it is already evident that, according to Plato, all the spheres are homocentric and have a centre which is the same as that of the universe, and the apparent non-uniformity of the motions of the seven planets comes to be from their own 'turning', as they change their motion in every way, accelerating, decelerating, moving forward [and backward], moving away from earth and towards it, all these things coming to be without the epicycles which some have fabricated. For Plato does not mention any such things. And everywhere nature demands a mean. But what is a mean between everything uniform and ordered and everything non-uniform and disordered is what is both non-uniform and ordered, as is the form of the motion of the planets, which compensates for their non-uniformity with a certain order, which is always the same, of speed and slowness and of having 'turnings' at the same points and the points opposite to them. If some people made use of certain epicycles or eccentrics and hypothesised uniform motions so that they would be able to find the numbers of the motions by combining the numbers in which the epicycles and the eccentrics and the heavenly bodies on them move, the idea was lovely and suitable for logical minds, but it fell far short of the nature of the universe, which only Plato grasped. IM

(8) Simplicius *in Cael.* 444,33-445,3

There have been some, including Heracleides of Pontus and Aristarchus, who thought the phenomena were preserved if the heavens and the stars were at rest but the earth moved around the pole of the equator from west [to east], each day making practically one rotation. They added the word 'practically' because of the sun's other movement of one degree [i.e. its daily change of position relative to the fixed stars]. IM

(9) Simplicius *in Cael.* 519,9-11

Heracleides of Pontus thought he could preserve the phenomena by hypothesising that the heaven is stationary and that the earth is in the centre and moves in a circle. IM

(10) Simplicius *in Cael.* 541,13-542,3

The fact that the astronomers also show that heavenly phenomena occur as if the earth lies at the centre and is stationary also provides evidence that the earth does lie at the centre and is stationary. The next part of the text says this [cf. Aristotle *Cael.* 297a4-6]: if the figures by which the order of the heavenly bodies is determined change, the phenomena follow, if the earth [is assumed to] lie at the centre. For the order of the heavenly bodies is determined by reference to the configurations relating to the motions. For if the earth were not in the middle of the heaven, the magnitudes of heavenly bodies first appearing in the East, then reaching the meridian, and finally being in the West would not always appear equal; rather, if the earth had been displaced to the West the same heavenly bodies would appear larger when they set than when they rose, and the opposite would be the case if the earth had been displaced to the East – and similarly for the distances between them. And eclipses of the moon would not have an order of their configurations such that they always occurred when the moon is diametrically opposite the sun, but they would also occur in distances less than a semicircle. And this would happen even if the earth moved from place to place. For if it moved in a circle about the centre, as Heracleides of Pontus hypothesised, and the heavens were stationary, if it moved toward the West, the heavenly bodies would be seen rising from there. And if it moved toward the East, then, if it rotated about the poles of the equator, the sun and the other planets would not rise at different places on the horizon, and, if it rotated about the poles of the zodiac, the fixed stars would not always rise from the same places as they now do; and whether it moved about the poles of the equator or about the poles of the zodiac, how would the movement of the planets into successive zodiacal signs be preserved, if the heavens were motionless? Ptolemy also says this [cf. *Almagest* 1.25, 6-12]: that all things not standing [on the earth] would always appear to have one motion opposite to that of the earth, and neither would a cloud ever be shown proceeding toward the East nor would any birds or projectiles, since the earth would always exceed everything in speed, since it makes so great a revolution in such a short time. IM

(11) Calcidius *in Tim.* 110, p. 157 Waszink

Finally, Heracleides of Pontus, when describing the circle of the Morning Star [Venus] and likewise that of the sun and giving the two circles one centre (*punctum*) and one middle, demonstrated that the Morning Star comes to be sometimes above and sometimes below the sun. RRKS

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Abbreviations and Sigla

Most commentaries are contained in the series *Commentaria in Aristotelem Graeca* (= *CAG*), ed. H. Diels, Berlin.

Abst. = *de Abstinentia*
Cael. = *de Caelo*
Cat. = *Categories*
Comm. Not. = *de communibus notitiis*
Cons. = *Consolation of Philosophy*
DA = *de Anima*
de An. et Res. = *de Anima et Resurrectione*
de Dec. Dub. = *de decem dubitationibus*
de Hom. Opif. = *de Hominis Opificio*
EN = *Nicomachean Ethics*
Enarr. in Psalmos = *Enarratio in Psalmos*
ET = *Elements of Theology*
GC = *de Generatione et Corruptione*
Gen. Lit. = *de Genesi ad Litteram*
HA = *On the History of Animals*
in Alc. 1 = *Commentary on Plato's First Alcibiades*
in An. Post. = *Commentary on Aristotle's Posterior Analytics*
in An. Pr. = *Commentary on Aristotle's Prior Analytics*
in Cael. = *Commentary on Aristotle's de Caelo*
in Cat. = *Commentary on Aristotle's Categories*
in Crat. = *Commentary on Plato's Cratylus*
in DA = *Commentary on Aristotle's de Anima*
in EN = *Commentary on Aristotle's Nicomachean Ethics*
in Eucl. 1 = *Commentary on Euclid's Elements Book I*
in GC = *Commentary on Aristotle's de Generatione et Corruptione*
in Gorg. = *Commentary on Plato's Gorgias*
in Hex. = *in Hexaemeron*
in Int. = *Commentary on Aristotle's de Interpretatione*
in Metaph. = *Commentary on Aristotle's Metaphysics*
in Meteor. = *Commentary on Aristotle's Meteorologica*
in Parm. = *Commentary on Plato's Parmenides*
in Phaed. = *Commentary on Plato's Phaedo*
in Phaedr. = *Commentary on Plato's Phaedrus*
in Phileb. = *Commentary on Plato's Philebus*
in Phys. = *Commentary on Aristotle's Physics*
in Remp. = *Commentary on Plato's Republic*
in Sens. = *Commentary on Aristotle's de Sensu*
in Somn. Scip. = *in Somnium Scipionis*
in Tim. = *Commentary on Plato's Timaeus*
in Top. = *Commentary on Aristotle's Topics*
Isag. = (*Isagoge*) *Introduction*

Lib. Arb. = *de libero arbitrio*
Lives = *Lives of Eminent Philosophers*
Mant. = *Mantissa*
Math. = *Adversus Mathematicos*
Metaph. = *Metaphysics*
Mixt. = *de Mixtione*
Myst. = *de Mysteriis*
Opif. = *de opificio mundi*
PA = *On the Parts of Animals*
PH = *Hypotyposes Pyrrhonenses* (*Outlines of Pyrrhonism*)
PHP = Galen, *de Placitis Hippocratis et Platonis*, ed. P. de Lacy, *Corpus Medicorum Graecorum* V.4.1-2, Berlin 1978
Phys. = *Physics*
Polit. = *Statesman*
Princ. = *On First Principles*
Prov. = *de Providentia*
PT = *Platonic Theology*
QAM = *Quod animi mores*
Quaest. = *Quaestiones*
Rep. = *Republic*
Rhet. = *Rhetoric*
St. Rep. = *de Stoicorum Repugnantiis*
Strom. = *Stromateis*
Symp. = *Symposium*
Theaet. = *Theaetetus*
Tim. = *Timaeus*
Trin. = *On the Trinity*

ANRW = *Aufstieg und Niedergang der römischen Welt*
CCAA = *Corpus commentariorum Averrois in Aristotelem*
CCL = *Corpus Christianorium Series Latina*
CLCAG = *Corpus Latinum Commentariorum in Aristotelem Graecorum*
CMAG = *Catalogue des manuscrits alchimiques grecs*
CSEL = *Corpus Scriptorum Ecclesiasticorum Latinorum*
Dox. Gr. = H. Diels, *Doxographi Graeci*, Berlin 1879, Berlin and Leipzig 1929
FHS&G = William Fortenbaugh, Pamela Huby, Robert Sharples, Dimitri Gutas, *Theophrastus of Eresus: Sources*, Parts 1 and 2, Leiden 1992
GCS = *Die griechischen christlichen Schriftstellen*
LS = A.A. Long, D.N. Sedley, *The Hellenistic Philosophers*, vol. 1, Cambridge 1987
OSAP = *Oxford Studies in Ancient Philosophy*
OCT = Oxford Classical Text
PG = Migne, *Patrologia Graeca*
PL = Migne, *Patrologia Latina*
SVF = H. von Arnim, *Stoicorum Veterum Fragmenta*, Leipzig, 1903-5

< > Angle brackets indicate an addition proposed to the original text.
[ ] Square brackets are used for explanatory additions to the translation which are not in the original.
Inverted commas around an author's name or a question mark after an author's name indicate some uncertainty about the attribution to that author.

Main Thinkers Represented in the Sourcebook

For biographical detail, see Richard Goulet, *Dictionnaire des philosophes antiques*, CNRS Paris (up to the letter J in 2000).

Abû Bishr Mattâ, Arabic translator *c.* 900 AD
Aidesius of Cappadocia, pupil of Iamblichus *c.* 280/290 – *c.* 355 AD
Albert the Great, teacher of Thomas Aquinas, 13th cent. AD
Alcinous, Middle Platonist, mid-2nd cent. AD
Alcmaeon, Presocratic philosopher, born around 500 BC?
Alexander of Aphrodisias, leading commentator in the Aristotelian school, fl. *c.* 205 AD
Amelius, student of Plotinus in 3rd cent. AD
Ammonius, son of Hermeias, pupil of Proclus and head of Alexandrian Neoplatonist School, *c.* 435/45-517/26 AD
Ammonius Saccas, teacher of Plotinus in 3rd cent AD
Andronicus of Rhodes, Aristotelian editor of Aristotle, 1st cent BC
Antipater of Tarsus, head of Stoic School *c.* 152 – *c.* 129 BC
Antoninus, pupil, like Plotinus, of Ammonius Saccas, 3rd cent. AD
Apollonius of Perga, astronomer, *c.* 200 BC
Apollonius of Tyana, neo-Pythagorean, 1st cent. AD
Apuleius, Middle Platonist, Latin author of *The Golden Ass*, born *c.* 123 AD
Archedemus of Tarsus, founder of Stoic school in Babylon, *c.* 145 BC
Archimedes, mathematician and inventor, *c.* 287-212/211 BC
Archytas, Pythagorean friend of Plato, first half of 4th cent. BC
[pseudo]-Archytas, neo-Pythagorean, author of a *Categories* purporting to pre-date Aristotle's, second half of 1st cent. AD
Aristarchus of Samos, pupil of Strato, propounded heliocentric hypothesis, observed summer solstice in 280 BC
Aristotle, 384-322 BC
Aristotheros, had controversy on astronomy with Autolycus, 4th cent. BC
Asclepius, Neoplatonist pupil of Ammonius, son of Hermeias, in 6th cent. AD
Aspasius, Aristotelian, 2nd cent. AD
Athenagoras, Alexandrian Church Father, late 2nd cent. AD, taught Clement
Athenodorus, probably the Stoic teacher of the Emperor Augustus, 1st cent. BC
Atticus, Middle Platonist, fl. *c.* 176-180 AD
Augustine, St, Bishop of Hippo, 354-430 AD
Autolycus of Pitane, astronomer, 4th cent. BC
Averroes, Islamic philosopher, *c.* 1126 – *c.* 1198 AD
Avicenna, Islamic philosopher, *c.* 980-1037 AD
Bacon, Roger, 1214/20-1292 AD
Basil of Caesarea, Cappadocian bishop, brother of Gregory of Nyssa, *c.* 330-379 AD
Boethius, Christian Neoplatonist, provided Neoplatonising commentaries in

Latin on Aristotle's logic, author of *The Consolation of Philosophy*, *c.* 480 – *c.* 525 AD
Boethus of Sidon, Aristotelian pupil of Andronicus, 1st cent. BC
Bonaventure, St, *c.* 1217-1274 AD
Calcidius, Christian commentator in Latin on Plato's *Timaeus*, 4th-5th cent. AD
Callippus, astronomer associate of Aristotle, refined the theories of Eudoxus, 4th cent. BC
Chaldaean Oracles, text of *c.* 200 AD, first commented on by Porphyry
Chrysippus, leading Stoic, 3rd head of School between *c.* 232 and *c.* 206 BC
Claudianus Mamertus, Christian writer in Latin, influenced by Porphyry, died *c.* 474 AD
Cleanthes, 2nd head of Stoic School, died *c.* 232 BC
Clement of Alexandria, head of Christian School in Alexandria, 150-215 AD
Cleomedes, Stoic following Posidonius, between 0 and 150 AD
Cornutus, Stoic, 1st cent. AD
Damascius, last head of Athenian Neoplatonist school, closed 529 AD
David, Christian commentator on Aristotle's logic, late 6th cent. AD
Democritus, Presocratic philosopher, fl. *c.* 435 BC
Democritus Chnous, Platonist, 3rd cent. AD
Dexippus, Neoplatonist pupil of Iamblichus, 4th cent. AD
Diodorus Cronus, dialectician, died *c.* 284 BC
Diogenes of Babylon, head of Stoic School, died *c.* 152 BC
[pseudo]-Dionysius, passed off paraphrases of Proclus as early Christian mystical documents, around start of 6th cent. AD
Dousareios, Egyptian priest mentioned by Ammonius
Elias, Christian commentator on Aristotle's logic, late 6th cent. AD
Epictetus, Stoic, between *c.* 50 and *c.* 125 AD
Epicurus, founded his School in Athens *c.* 307 BC, died 271 BC
Epiphanius, *c.* 315-403, considered philosophy to be heresy, and excerpted Methodius' arguments against Origen.
Euclid, mathematician, author of the *Elements*, between 325 and 250 BC
Eudoxus, astronomer colleague of Plato, 4th cent. BC
Eudemus, pupil of Aristotle, late 4th cent. BC
Eusebius, Church historian, *c.* 263-339 AD
Eustratius, commentator on Aristotle, 1050/1060 – *c.*1120 AD
Evagrius, 4th cent. AD desert Father
Farabi, Islamic philosopher, *c.* 873-950 AD
Galen, doctor and eclectic philosopher, *c.* 129-199 AD
Ghazâlî, Islamic philosopher 1058-1105 AD
Gorgias, orator, sophist of 5th cent. AD, subject of Plato's *Gorgias*
Gregory of Nyssa, Cappadocian bishop, reader of Porphyry, brother of Basil of Caesarea, *c.* 335-394 AD
Grosseteste, Aristotelian scholar, early 13th cent AD
Heracleides of Pontus, Platonist, 4th cent. BC, turned to Aristotelian school
Heraclitus, Presocratic philosopher, wrote between 499 and 478 BC
Hermarchus, succeeded Epicurus, 271 BC
Hermeias, reproduced lectures on Plato *Phaedrus* by his teacher Syrianus in 5th cent. AD
Herminus, teacher of Alexander of Aphrodisias, 2nd cent. AD
Hermotimus, legendary shaman
Hero of Alexandria, pneumatologist, 1st cent. BC
Herophilus, discovered the nerves and ovaries, 3rd cent. BC

Hierocles, Alexandrian Neoplatonist, studied under Plutarch of Athens before 423 AD
Hierocles, Stoic ethicist, fl. *c.* 100 AD
Hipparchus, astronomer, 2nd cent. BC
Hippocrates of Cos, doctor, between 460 and 360 BC, around whose work there grew a corpus of 60 medical treatises.
Iamblichus of Apamea, rebellious pupil of Porphyry, reforming theological basis of Neoplatonism, *c.* 250 – before 325 AD
Jerome, translator of the Bible into Latin, correspondent of Augustine, *c.* 347-419/20 AD
Julian of Tralles, Aristotelian or Platonist of *c.* 100 AD, cited for astronomical opinions.
Julian, Emperor and follower of Iamblichus, tried and failed to restore paganism, 331-363 AD
Longinus, Neoplatonist fellow student of Plotinus, 3rd cent. AD
Lucius, Platonist critic of Aristotle's *Categories*, like Nicostratus
Lucretius, formulated Epicureanism in Latin verse, *c.* 94-55/51 BC
Macrobius, 5th-cent. populariser of Neoplatonism in Latin
Maimonides, Jewish philosopher, 1135-1204 AD
Manicheans, followers of Mani, heretics opposed by Augustine
Marcus Aurelius, Emperor, Stoic, 121-180 AD
Marinus, pupil and hagiographer of Proclus, late 5th cent. AD
Maximus of Ephesus, *c.* 320-372 AD, studied under Iamblichus' pupils
Methodius, bishop, opponent of Origen, perhaps start of 4th century AD
Metrodorus of Chios, Democritean atomist, 4th cent. BC
Michael of Ephesus, 12th-cent. commentator on Aristotle
Mnesarchus, joint head of Stoic School from 110 BC
Moderatus of Gades (Cadiz), neo-Pythagorean, early 1st cent. AD
Nemesius, bishop and cultivated source for pagan philosophy, late 4th cent. AD
Nicostratus, Platonist, critic of Aristotle's *Categories*, 2nd cent. AD
Olympiodorus, last pagan head of Alexandrian Neoplatonist School, 495/505 – after 565 AD
Origen, Christian utilising pagan philosophy, successor to Clement in Alexandria, *c.* 185-253/4 AD
Parmenides, Presocratic philosopher, born *c.* 515 BC
Philo of Alexandria, Jewish philosopher, 1st cent. AD
Philo, dialectician, pupil of Diodorus Cronus, early 3rd cent. BC
Philoponus, Christian Neoplatonist pupil of Ammonius, using pagan arguments to supplant pagan science, *c.* 490-570s AD
Philopator, Stoic opposed by Alexander, 2nd cent. AD
Plato, *c.* 427-348 BC
Plotinus, founder of Neoplatonism, *c.* 205-260 AD
Plutarch of Chaironeia, Middle Platonist, *c.* 46-120 AD
Plutarch of Athens, teacher of Syrianus and Proclus, died by 432 AD
Polemarchus of Cyzicus, astronomer pupil of Eudoxus, 4th cent. BC
Porphyry, pupil, biographer, and editor of Plotinus, critic of pagan and Christian religion, stabiliser of the tradition of commentary on Aristotle, 232-309 AD
Posidonius, Stoic, *c.* 135-51 BC
Priscian of Lydia, member of Athenian Neoplatonist school at closure in 529 AD
Proclus, head of Athenian Neoplatonist school, *c.* 411-485 AD
Ptolemy, astronomer, fl. between 146 and *c.* 170 AD
Pythagoras, 2nd half of 6th cent. BC
Sallustius, Neoplatonist, associate of Emperor Julian, 4th cent. AD

Seneca, Stoic, tutor to the tyrant Nero, *b.* 4-1 BC; *d.* 65 AD
Severus, Platonist of 2nd cent. AD
Sextus Empiricus, Pyrrhonian sceptic, late 2nd cent. AD
Simplicius, left Athenian school at closure in 529 AD, and thereafter wrote the most comprehensive commentaries extant
Sopater, pupil of Iamblichus
Sosigenes, teacher of Alexander of Aphrodisias, 2nd cent. AD
Stephanus, lectured on Aristotle in Byzantium and Alexandria around 600 AD
Strato, 3rd head of Aristotelian School, died *c.* 269 BC
Synesius, Christian Neoplatonist, bishop, *c.* 370-413 AD
Syrianus, Neoplatonist pupil of Plutarch of Athens, teacher of Proclus and Hermeias, died *c.* 437 AD
Taurus, Middle Platonist, fl. *c.* 145 AD
Themistius, rhetorician and commentator, with Platonist tendencies, though not belonging to the Neoplatonist school, fl. late 340s-384/5 AD
Theodore of Asine, pupil of Iamblichus, 4th cent. AD
Theodore of Mopsuestia, Christian disparaged by Philoponus, 352-428 AD
Theophrastus, succeeded Aristotle in 322, died 287 BC
Thomas Aquinas, St, author of *Summa Theologiae*, *c.* 1225-1274 AD
Ibn Tufayl, Islamic philosopher, died 1185 AD.
William of Moerbeke, 13th cent. AD, translated commentaries into Latin for Thomas Aquinas
Xenarchus, Aristotelian, end of 1st cent. BC
Xenocrates, became 3rd head of Plato's School in 339, died 314 BC
Xuthus, Pythagorean mentioned by Aristotle
Zeno of Citium, founder of Stoicism, *c.* 300 BC
Zeno of Elea, Presocratic author of paradoxes of motion, *b. c.* 490/485 BC

Index Locorum

The edition used for ancient commentaries on Aristotle is the Prussian Academy edition, ed. H. Diels, Berlin, *Commentaria on Aristotelem Graeca* (*CAG*), wherever available. For other works, sometimes a new and superior edition appeared while the work was under way. In the few cases where translations have not all been harmonised with the superior edition, this has been indicated.

References in bold are to the chapter and section numbers of this book.

Alexander

Refutation of Galen's attack on 'everything that moves is moved by something' 67a (Carullah *ms* 1279) translated from Arabic by Rescher-Marmura, Islamabad 1969, p.17 **1(d)(7)**, **22(a)(1)**

DA, *CAG* suppl. 2.1 3,21-4,4 **17(b)(1)**; 20,8-15 **20(d)(5)**; 88,26-89,4 **6(f)(5)**

in An. Pr., *CAG* 2.1 183,34-184,10 **5(e)(2)**, **5(e)(4)**

in Metaph., *CAG* 1 22,2-3 **23(b)(5)**; 59,28-60,2 (Aristotle *On the Good* fr. 4 Ross) **6(a)(1)**; 63,23-31 (Aristotle *On the Good* fr. 4 Ross) **6(a)(2)**; 103,4-104,18 **1(b)(1)**; 147,15-28 **6(f)(4)**; 169,17-19 **23(b)(6)**; 375,37-376,4 **23(b)(7)**

in Metaph. from Averroes' *Epitome of the Metaphysics* (= fr. 36 Freudenthal translated from the German version of the Hebrew) **3(a)(6)**, **4(a)(5)**

in Meteor. 4, *CAG* 3.2 7.9-14 **1(b)(13)**

in Sens., *CAG* 3.1 31,9-18 **19(b)(19)**, **19(d)(4)**; 73,17-21 **6(h)(5)**

Mixt., *CAG* suppl. 2.2 216,14-217,2 **20(c)(1)**; 219,9-28 **20(d)(1)**; 220,3-11 **20(d)(1)**; 221,25-222,26 **20(b)(6)**; 226,24-30 **1(b)(15)**; 229,3-9 **23(a)(22)**, **23(b)(2)**; 231,8-10 **20(a)(2)**; 231,12-19 **20(b)(5)**; 231,22-9 **20(a)(3)**

On Fate, *CAG* suppl. 2.2 169,20-6 **1(b)(9)**; 169,18-170,12 **5(g)(1)**; 171,7-17 **5(g)(2)**; 172,25-173,7 **5(f)(1)**; 174,14-20 **5(f)(2)**; 176,17-177,7 **5(e)(7)**; 177,7-14 **5(e)(6)**; 182,4-8 (LS 62G) **1(d)(3)**; 185,8-9 **5(d)(2)**; 185,28-186,2 **5(i)(1)**; 192,22-3 **5(d)(1)**; 194,15-22 **5(f)(3)**; 199,30-200,2 **21(a)(10)**; 200,12-22 **3(a)(2)**; 201,13-26 **3(a)(3)**

On Time translated from Arabic attributed to Hunayn b. Ishâq, ed. Badawi, with reference to Latin of Gerard of Cremona's translation from the Arabic, ed. Théry 21,5-16 = Latin 94,22-43 **11(e)(8)**; 22,2-4 = Latin, 95,11-15 **11(d)(2)**; 24,7-9 = Latin 97,5-9 **11(e)(9)**

On the Principles of the Universe ed. Badawi = *On the Cosmos*. ed. Genequand (2001) which supersedes, translated from Genequand edition 11 and 13 **22(e)(3)**; 17-19 **1(d)(8)**; 21-3 **22(e)(3)**; 86 **22(e)(12)**; 127-9 **6(b)(2)**; translated from Badawi edition 268,3-8 **22(e)(7)**; 268,12-18 **22(e)(5)**

On Providence, translated from Arabic of Abû Bishr Mattâ, ed. Ruland

13,14-17 **3(a)(4)**, **4(a)(6)**; 25,1-19 **3(a)(5)**, **4(a)(7)**; 57,8-67,9 **4(a)(8)**; 63 **4(c)(2)** included in **4(a)(8)**; 77,12-79,9 **1(b)(14)**; 87,5-91,4 **4(a)(4)**
translated from early 9th century Arabic by Ruland, 101,3-105,4 **4(f)(1)**
quoted in Cyril of Jerusalem, *Against Julian*, *PG* 76, 625B-C **4(a)(3)**
ap. Simplicium *in Cael.*, *CAG* 7.1 266,29-267,6 **22(f)(3)**; 270,9-12 **22(e)(9)**; 380,29-381,2 **1(d)(9)**; 387,5-19 **22(e)(16)**; 387,12-19 **1(d)(10)**; 440,1-19 **23(d)(3)**; 442,4-12 **23(d)(1)**; 443,11-16 **23(d)(2)**; 444,6-8 **23(d)(4)**
ap. Simplicium *in Phys.*, *CAG* 9-10 264,18-22 **1(a)(1)**; 310,20-311,30 **1(b)(2)**; 409,12-32 **2(c)(8)**; 436,26-32 **2(c)(3)**; 516,29-32 **14(d)(2)**; 530,14-24 **20(d)(6)**; 735,28-30 **11(e)(6)**; 748,21-7 **11(e)(7)**; 759,20-760,3 **11(d)(3)**; 1219,1-7 **1(d)(11)**; 1260,21-31 **22(e)(10)**; 1261,30-1262,4 **22(e)(11)**

Alexander(?)
Quaest., *CAG* suppl. 2.2 1.1, 3,10-14 **22(e)(1)**; 1.4, 12,13-12,19; 13,2-9 **5(a)(2)**; 1.10, 20,31-21,6 **23(b)(3)**; 1.10; 1.15, 26,30-27,7 **23(c)(1)**; 1.15, 26,29-27,29 **23(b)(4)**; 1.18, 31,24-32,19 **9(h)(1)**; 1.25, 40,8-23 **22(e)(4)**; 1.25, 40,23-30 **22(e)(6)**; 1.25, 40,28-41,4 **4(a)(1)**; 1.25, 41,4-12 **4(a)(9)**; 2.21, 66,17-68,19 **4(c)(1)**; 2.3, 47,30-48,1 **1(b)(11)**; 2.3, 49,29-50,7 **1(b)(12)**; 2.19, 63,21-6 **4(a)(2)**; 3.12, 102,15-18 **14(e)(1)**; 3.12, 104,24-9 **14(d)(1)**; 3.12, 106,37-107,4 **14(b)(1)**
Mantissa, *CAG* suppl. 2.1 124,13-20 **20(d)(2)**; 140,31-141,8 **20(d)(3)**; 141,9-16 **20(d)(10)**; 171,11-27 **5(f)(6)**; 172,7-12 **5(f)(7)**; 172,17-23 **1(b)(10)**

[pseudo-]Alexander
in Metaph. 707,1-6 **22(e)(13)**

Ammonius
in Int., *CAG* 4.5 131,20-132,7 **5(c)(1)**; 133,15-27 **3(a)(14)**; 136,1-3; 15-21 **3(a)(15)**; 139,32-140,4 **5(a)(5)**; 141,31-142,1 **5(a)(6)**; 143,17-22 **5(a)(7)**; 144,9-14 **5(a)(8)**; 148,5-12 **5(a)(9)**; 149,15-18 **5(a)(10)**
ap. Asclepium *in Metaph.*, *CAG* 6.2 44,32-37 **8(c)(2)**
ap. Simplicium *in Phys.*, *CAG* 10 1361,11-1363,12 **8(c)(1)**; 1363,4-12 **8(d)(3)**

Anonymous
in Int. ed. Tarán, Meisenheim am Glan 1978 54,8-55,5 **5(c)(3)**

[pseudo-]Archytas
ap. Simplicium *in Cat.*, *CAG* 8 352,29-30 **11(e)(25)**; 353,13-15 **11(e)(16)**; 354,28-34 **11(e)(17)**; 361,7-362,33 **13(f)(2)**; 363,21-9 **13(b)(5)**
ap. Simplicium *in Phys.*, *CAG* 9 467,26-35 **14(a)(1)**

Aristotle (citing columns and lines of Bekker edition)
Cael. Guthrie, Loeb 1.1, 268a7-8; 268b6 **18(b)(1)**; 1.2, 283a9-10 **9(a)(6)**; 1.9, 279a17-b3 **12(a)(1)**
Cat. Minio-Paluello, OCT 8, 10b26-11a5 **21(a)(5)**
DA Hicks 2.7, 418b9 **19(a)(3)**; 2.7, 418b16 **19(a)(4)**; 2.7, 418b20 **19(a)(4)**; 2.7, 419a11 **19(a)(3)**
GC Joachim ed. and comm. 1.5, 320b17-21 **6(f)(1)**; 1.10, 327b22-31 **20(a)(1)**; 1.10, 328a33-5; b22 **20(b)(1)**; 2.8, 334b30-335a9 **20(g)(1)**
Metaph. Ross ed. and comm. 5.6, 1016b28 **18(b)(2)**; 7.3, 1028b36-1029a2 **17(a)(1)**; 7.3, 1029a9-28 **17(a)(2)**; 8.4, 1044b7-8 **23(b)(1)**; 12.9, 1074b21-7 **3(a)(1)**
Nicomachean Ethics Bywater, OCT 6.2, 1139b10-11 **3(b)(1)**
Phys. Ross ed. and comm., 1936

3.1, 201a10-11 **2(b)(1)**, **2(c)(1)**; 3.2, 201b31-2 **2(a)(1)**; 3.2, 202a7-8 **2(c)(1)**; 3.3, 202a13-21; b5-22 **6(g)(1)**; 3.5, 204a20-30 **10(a)(2)**; 3.5, 204b5-7 **18(f)(1)**; 3.6, 206a27-9 **10(a)(1)**; 3.6, 206a33-b3 **9(a)(4)**; 3.6, 207a7-10 **10(a)(3)**; 3.8, 208a20-1 **9(a)(5)**; 4.2, 209a32-4 **13(a)(11)**; 4.2, 209b6-11 **17(a)(3)**; 4.2, 209b11-13 **17(f)(1)**; 4.4, 211a24-34 **13(a)(2)**; 4.4, 211b28-9 **13(a)(12)**; 4.4, 212a14-21 **13(a)(1)**; 4.4, 212a21-4 **13(a)(13)**; 4.4, 212a29-30 **13(a)(3)**; 4.5, 212b17-22 **13(a)(14)**; 4.8, 216b2-12 **16(a)(1)**; 5.2, 225b11-13 **2(c)(2)**; 6.1, 231b6-10 **10(a)(4)**

Sens. Ross ed. and comm. 3, 439a20 **19(a)(5)**; 4, 441b12-15 **6(h)(4)**; 6, 445b28-31 **21(a)(2)**; 6, 446a16-20 **21(a)(3)**; 6, 446a20-447a11 **19(d)(1)**; 6, 446b29-447a3; 447a8-11 **21(a)(1)**

'Aristotle'

Problems Ruelle, Teubner 17.3, 916a18-39 **11(b)(1)**

Arius Didymus

ap. Stobaeum (fr. 28) 1,153,24-155,14 Wachsmuth = *Dox. Gr.* 463,14-464,8 = *SVF* 2.471 **20(c)(2)**

Asclepius

in Metaph., *CAG* 6.2 44,32-7 **8(c)(2)**; 361,1-3; 413,31-4 **1(d)(22)**

Aspasius

in EN, *CAG* 19.1 99,31-100,4 **21(a)(9)**

ap. Simplicium *in Phys.*, *CAG* 9 578,26-9 **17(f)(4)**

Augustine

ad Simplicianum Mutzenbecher, *CCL* 44 2.2.2 lines 27-56 **3(a)(12)**

City of God Dombart and Kalb, 4th ed., is reprinted virtually unchanged in the Loeb, and in *CCL* 47-8, which is the edition cited 5.8.1-35 **4(b)(8)**; 10.31.7-18 **6(c)(1)**; 10.31.18-29 **9(h)(5)**; 11.21.12-26 **3(a)(13)**; 11.23.28-30 **4(e)(2)**; 22.24.57-63 **8(f)(2)**

Confessions Verheijen, *CCL* 27 11.20.26; 11.26.33; 11.27.36 **11(d)(13)**

Enarr. in Psalmos Dekkers, Fraipont, *CCL* 40 145,13-14 (verse 6) **4(a)(16)**

Gen. Lit. Zycha, *CSEL* 28, with paragraph numbers of the 1680 Paris edition 5.21.45 **4(a)(19)**

On the Trinity Mountain, *CCL* 50 3.8.1-11 **8(f)(1)**

Boethius

Consolation of Philosophy Bieler, *CCL* 94 4, prose 6, sections 7-14 **4(b)(6)**; 4, prose 6, section 13 **5(h)(4)**; 5, prose 1, sections 12-19 **4(c)(3)**; 5, prose 6, sections 16-21 **5(b)(1)**; 5, prose 6, sections 4-14 **12(a)(4)**

in Int.[1] Meiser 106,30-107,16 **5(a)(4)**; 118,13-119,13 **5(a)(11)**; 193,26-194,23 **5(f)(4)**; 208,1-18 **5(a)(3)**

in Int.[2] Meiser 229,21-230,3 **5(a)(12)**; 231,12-19 **4(a)(17)**; 234,10-26 **5(e)(3)**; 234,22-6 **5(e)(1)**

On the Trinity, Stewart, Rand, Tester, Loeb 2nd ed. 4,60-72 **12(a)(3)**

Boethus

ap. Simplicium *in Phys.*, *CAG* 9 759,18-20 **11(d)(1)**

Calcidius

in Tim. Waszink 110, p. 157 **24(a)(11)**

Chrysippus

in Plutarch, *St. Rep.* Cherniss, Loeb 1050c-d **1(h)(1)**

Cleomedes

de Motu circulari Todd 1.1.81-8 **14(c)(1)**; 1.1.104-9 **18(f)(2)**

Damascius

in Parm. Ruelle 2,241,29-242,5; 242,9-15 **11(e)(2)**

On First Principles
Westerink-Combès
2,123,13-22; 2,124,18-20 **6(b)(4)**
ap. Simplicium *in Phys.*, *CAG* 9
775,31-5 **11(e)(14)**;
796,32-797,13 **11(e)(1)**;
797,36-798,4 **11(e)(4)**; 798,5-26 **11(e)(10)**; 799,8-18 **11(e)(5)**;
799,18-21; 27-30 **11(e)(11)**;
799,35-800,16 **11(e)(15)**
Philosophical History Athanassiadi
118B **Introduction**
Dexippus
in Cat., *CAG* 4.2
40,28-41,3 **8(c)(3)**; 41,7-18 **8(c)(4)**
Epicurus
ap. Sextum *Math.* Mau, Teubner
1.21 **18(a)(3)**
Eudemus
ap. Simplicium *in Phys.*, *CAG* 9-10
595,5-9 **13(a)(10)**; 595,9-15 **13(b)(1)**; 1262,18-19 **22(e)(8)**
Galen
On the Natural Faculties
Helmreich, Teubner, *Scripta Minora* vol. 3
1.1.1-2 **1(d)(2)**
On the Use of Parts Helmreich
2,439,12-440,3 **1(b)(4)**;
2,442,25-443,8 **1(b)(3)**;
2,449,8-14 **1(b)(5)**;
2,450,26-451,9 **1(b)(6)**
PHP de Lacy, *Corpus Medicorum Graecorum* V.4.1,2
6.3.7 (*SVF* 2.710) **1(d)(1)**
ap. Philoponum *contra Proclum*
Rabe, Teubner
600,14-601,19 **9(h)(4)**
'Galen'
de Qualitatibus Incorporeis Kühn, vol. 19
10,483,13-14 = *SVF* 2.381 **18(a)(2)**
Gregory of Nyssa
de An. et Res., *PG* 46
124B-D **7(a)(3)**
de Hom. Opif., *PG* 44
212D-13B **7(a)(4)**
in Hex., *PG* 44
69B-C **7(a)(2)**
Hierocles
On Providence, Fate and the Coordination of what is up to us with Divine Authority in Photius *Bibliotheca*, vol. 7, Henry, with Bekker line numbers
461b21-31, 192-3 **4(b)(7)**;
463b4-10, 197-8 **5(j)(2)**
Iamblichus
Myst. Des Places (adding his line numbers to Parthey's page numbers)
2.4, 77,10-18 **19(b)(11)**; 9.1, 273,2-12 **1(f)(2)**
On the Soul ap. Stobaeum, Wachsmuth
1,365,7-14, 17-21 **8(e)(5)**;
1,378,25-379,6 **4(g)(5)**;
1,380,6-19 **4(g)(6)**;
1.153,24-155,14 **20(c)(2)**
ap. Ammonium *in Int.*, *CAG* 4.5
135,14ff. **3(a)(10)**
ap. Proclum *in Tim.*, Diehl
1.307,14-19 **8(e)(4)**; 1.308,19-23 **8(e)(6)**
ap. Simplicium *in Cat.*, *CAG* 8
352,29-30 **11(e)(25)**; 353,13-15 **11(e)(16)**; 354,9-26 **11(e)(23)**;
354,28-34 **11(e)(17)**; 355,8-14 **11(e)(22)**; 355,29-356,1 **11(e)(19)**
ap. Simplicium *in Phys.*, *CAG* 9
640,1-11 **13(f)(1)**; 787,10-11 **11(e)(21)**; 787,17-20 **11(e)(24)**;
793,3-7 **11(e)(20)**; 793,22-3 **11(e)(18)**; 794,12-15 **11(d)(9)**
Letter to Sopater, *ap.* Stobaeum, Wachsmuth
1,81,8 **5(g)(4)**
Iamblichus and pseudo-Archytas
ap. Simplicium *in Cat.*, *CAG* 8
361,7-362,33 **13(f)(2)**
Julian
to King Helios Lacombrade
5, 132c5-6, 103,8-10 **19(b)(7)**; 7, 133d1-3, 105,2-4 **19(b)(8)**; 7, 134a3-6, 105,12-15 **19(b)(9)**; 7, 134b1-4, 105,18-21 **19(b)(10)**
Macrobius
in Somn. Scip. Willis
1.13.4 **4(g)(4)**
Maimonides
Guide for the Perplexed, translated from Arabic ed. Munk, by Friedländer (there is a superior

translation of 1963 by Pines based on Munk revised by Joel) 3.16 **3(a)(7)**
Moderatus of Gades
in Porphyry *On Matter ap.* Simplicium *in Phys.*, *CAG* 9 231,5-21 **17(f)(3)**
Nemesius
On the Nature of Man Morani 35, 106,6-10 **1(d)(4)**; 38, 109,17-110,23 **5(j)(1)**; 43, 127,12-21 **4(d)(1)**
Nicostratus
ap. Simplicium *in Cat.*, *CAG* 8 406,6-16 **5(a)(1)**
Olympiodorus
in Gorg. Westerink Proem 5.1-6.1 **6(d)(2)**
in Phaed. Westerink 10 §1, 1-5 **10(g)(3)**
Origen
Against Celsus Borret, *Sources Chrétiennes* 2.20 **5(j)(3)**; 5.23 **1(f)(1)**
Philoponus
contra Aristotelem ap. Simplicium *in Cael.*, *CAG* 7 42,20-2 **23(a)(5)**; 78,17-22 (fr. 49 Wildberg) **22(e)(17)**; 79,8-13 (fr. 49 Wildberg) **22(e)(18)**; 84,15-22 (fr. 56 Wildberg) **23(a)(6)**; 88,28-34 (fr. 59 Wildberg) **23(a)(15)**; 90,13-18 (fr. 60 Wildberg) **23(a)(16)**; 133,21-9 (fr. 70 Wildberg) **23(b)(10)**; 199,27-35 (fr. 50 Wildberg) **1(d)(17)**
contra Aristotelem ap. Simplicium *in Phys.*, *CAG* 10 1178,7-35 (fr. 132 Wildberg) **9(a)(9)**; 1179,15-26 (fr. 132 Wildberg) **9(a)(1)**
contra Proclum, Rabe 9,14-11,17 **9(a)(2)**; 114,20-116,1 **12(a)(5)**; 281,22-282,14 **20(e)(12)**; 341,13-23 **9(f)(1)**; 405,23-7 **17(h)(1)**; 413,24-414,5 **17(h)(7)**; 424,4-11 **17(h)(2)**; 424,23-425,14 **17(h)(3)**; 425,25-428,5 **17(h)(8)**; 428,7-10 **17(h)(4)**; 428,14-25 **17(h)(5)**; 440,6-8 **17(h)(6)**; 448,16-21 **9(g)(1)**; 449,13-16 **6(f)(13)**, **9(g)(2)**; 450,2-8 **6(f)(14)**; 450,8-10 **9(g)(3)**; 479,16-20 **1(d)(15)**; 492,20-493,5 **22(e)(15)**; 524,19-526,3 **23(a)(14)**; 566,4-10 **9(c)(3)**; 567,23-568,2 **9(c)(4)**; 568,6-11 **9(c)(1)**; 568,20-569,6 **9(c)(2)**
de Opificio Mundi Reichardt 28,20-29,9 **1(b)17**, **22(e)(20)**, **22(f)(11)**; 231,3-233,8 **22(e)(19)**
in Cat., *CAG* 13.1 83,13-19 **17(g)(1)**
in DA, *CAG* 15 25,20-9 **1(d)(23)**; 51,13-52,1 **21(a)(14)**; 324,27-35 **19(c)(1)**; 325,33-5 **19(e)(1)**; 326,39-329,2 **19(b)(21)**; 328,13-15 **20(d)(7)**; 329,30-330,27 **19(d)(5)**; 330,19-27 **19(b)(22)**; 331,3-7 **19(e)(2)**; 332,5-22 **23(d)(7)**; 344,33-345,13 **19(d)(6)**
in GC, *CAG* 14.2 65,22-66,9 **20(a)(4)**; 84,3-13 **6(f)(2)**; 146,16-23 **21(a)(11)**; 146,30-147,4 **6(f)(3)**; 169,4-27 **21(a)(12)**; 170,12-35 **21(a)(13)**; 199,21-7 **22(d)(5)**; 202,21-5 **20(a)(5)**; 271,1-24 **20(a)(6)**, **21(a)(15)**; 271,25-272,10 **20(a)(7)**
in Meteor., *CAG* 14.1 49,22-34 **23(d)(6)**
in Phys., *CAG* 16-17 60,16-18 **21(a)(4)**; 98,13-99,3 **10(b)(2)**; 195,24-27 **1(d)(19)**; 195,24-32 **22(a)(2)**; 197,2-5; 13-22 **1(d)(20)**; 198,6-8 **1(d)(21)**; 198,12-16 **22(f)(7)**; 201,10-202,12 **1(h)(2)**; 312,23-313,9 **4(a)(12)**; 342,10-343,12 **2(b)(2)**; 367,6-369,1 **2(c)(4)**; 378,21-31 **22(f)(8)**; 384,11-385,11 **22(f)(10)**, **6(g)(3)**; 506,2-12 **20(d)(11)**; 559,9-18 **20(f)(10)**; 560,33-561,3 **20(f)(13)**; 561,3-12 **20(f)(14)**; 561,3-24 **17(g)(3)**; 561,5-24 **18(e)(1)**; 565,21-566,7 **13(b)(4)**; 571,9-23 **22(d)(7)**; 572,2-6 **22(d)(8)**; 577,10-16 **15(b)(1)**, **18(e)(2)**; 578,32-579,8 **17(g)(2)**; 579,6-9 **13(c)(3)**; 579,14-15 **22(d)(9)**; 581,18-31 **22(b)(4)**;

581,19-31 **22(a)(3)**;
582,19-583,12 **14(f)(1)**;
632,6-633,14 **22(b)(3)**;
641,13-642,20 **22(f)(6)**;
644,16-22 **22(d)(6)**;
678,29-679,23 **22(d)(3)**; 681,3-30 **22(d)(2)**; 683,23-4 **22(d)(4)**;
687,31-5 **18(e)(3)**; 690,34-691,5 **22(d)(1)**; 725,7-15 **11(g)(3)**;
892,4-23 **22(e)(14)**
ap. Simplicium *in Phys.*, *CAG* 10
1331,20-5 **23(c)(2)**
an Arabic summary of a lost work of Philoponus (translated by Pines, *Israel Oriental Studies* 2, 1992, 324-5)
324-5 **9(h)(2)**
'Philoponus'
in DA 3, *CAG* 15
526,28-527,5 **6(f)(15)**;
579,39-581,19 **11(j)(1)**
Plato (OCT, Burnet, citing pages and paragraphs from Stephanus edition)
Laws
896A3-B8 **6(h)(2)**; 904C6-9 **5(h)(1)**
Phaedrus
245C5-246A2 **6(h)(1)**
Timaeus
45B2-D3 **19(a)(1)**; 58C5-7 **19(a)(2)**
Plotinus
Enneads Henry-Schwyzer
1.4 [46] 13 (6-12) **12(b)(2)**; 1.5 [36] 7 **12(b)(1)**; 1.8 [51] 3 (1-6) **4(e)(4)**; 1.8 [51] 3 (35-40) **4(f)(2)**; 1.8 [51] 5 (5-9) **4(e)(3)**; 1.8 [51] 7 (16-23) **4(e)(5)**; 1.8 [51] 14 (49-54) **4(f)(3)**; 2.1 [40] 2 (5-16) **23(a)(14)**; 2.1 [40] 2 (12-16) **23(a)(23)**; 2.1 [40] 6 (12-16) **23(a)(14)**; 2.1 [40] 7 (10-19) **23(a)(24)**; 2.1 [40] 7 (19-28) **19(b)(18)**; 2.3 [52] 14 (17-19) **5(f)(5)**; 2.3 [52] 18 (8-16) **8(e)(1)**; 2.4 [12] 1 (13-14) **18(c)(2)**; 2.4 [12] 11 (1-15) **17(c)(3)**; 2.7 [37] 1 (8-9) **20(b)(2)**; 2.7 [37] 1 (15-19) **20(b)(3)**; 2.7 [37] 1 (15-48) **20(d)(4)**; 2.7 [37] 2 (7-26) **20(b)(4)**; 2.7 [37] 2 (30-42) **20(f)(1)**; 2.7 [37] 3 **18(i)(1)**; 3.2 [47] 2 (16-31) **4(e)(6)**; 3.3 [48] 5 (14-16) **4(b)(1)**; 3.3 [48] 7 (1-8) **4(e)(13)**; 3.4 [15] 1 (5-12) **6(f)(10)**; 3.4 [15] 5 (1-4) **4(g)(1)**; 3.6 [26] 1 (31-4) **6(f)(18)**; 3.7 [45] 6 (15-36) **12(a)(2)**; 3.7 [45] 11 (43-62) **11(d)(8)**; 3.8 [30] 2 (3-15) **1(b)(7)**; 3.8 [30] 3 (1-23) **1(d)(5)**; 3.8 [30] 4 (1-31) **1(d)(6)**; 3.9 [13] 3 (7-16) **17(c)(1)**; 4.3 [27] 13 (17-21) **4(g)(2)**; 4.3 [27] 16 (6-9) **4(e)(7)**; 4.3 [27] 25 (20-4) **3(a)(8)**; 4.4 [28] 8 (21-52) **3(a)(9)**; 4.4 [28] 8 (52-61) **6(k)(1)**; 4.4 [28] 10 (1-2) **8(e)(2)**; 4.4 [28] 11 (14-17) **6(f)(8)**; 4.4 [28] 23 (18-28) **6(f)(17)**; 4.4 [28] 29 (1-7; 12-15) **6(f)(19)**; 4.4 [28] 32 (35-51) **4(e)(10)**; 4.4 [28] 32 (10-25) **6(k)(5)**; 4.4 [28] 33 (11-41) **6(k)(6)**; 4.4 [28] 35 (40-4) **6(k)(2)**, **6(k)(7)**; 4.4 [28] 35 (65-9) **6(k)(10)**; 4.4 [28] 36 (1-15) **6(k)(8)**; 4.4 [28] 37 (11-26) **6(k)(9)**; 4.4 [28] 38 (7-11) **6(k)(4)**; 4.4 [28] 39 (23-32) **4(e)(8)**; 4.4 [28] 39 (29-30) **4(e)(9)**; 4.4 [28] 41 (1-12) **6(k)(3)**; 4.7 [2] 13 (1-13) **8(e)(3)**; 5.1 [10] 1 (1-17) **4(g)(3)**; 5.4 [7] 2 (26-39) **6(f)(9)**; 5.7 [18] 1 (23-4) **10(g)(1)**; 5.7 [18] 3 (13-23) **10(g)(1)**; 6.1 [42] 26 (17-23) **17(c)(4)**, **18(a)(1)**; 6.3 [44] 8 (19-37) **18(g)(1)**; 6.3 [44] 8 (34-37) **17(c)(2)**; 6.3 [44] 23 (13-20) **6(g)(2)**; 6.7 [38] 17 (3-14; 39-42) **6(f)(7)**; 6.9 [9] 2 (35-6) **Introduction**
Plutarch
On the Face Appearing in the Orb of the Moon, Cherniss, Loeb 928A-C **22(b)(5)**
On Tranquillity, Paton, Pohlenz, Sieveking, Teubner 474A-B **4(e)(1)**
Porphyry
On Abstinence from Killing Animals, Budé edition, Bouffartigue, Patillon 2.38.2 **4(a)(14)**; 2.40.1 **4(a)(15)**

ap. Iamblichum *On the Soul ap.* Stobaeum, Wachsmuth 1,365,17-21 **8(e)(5)**
Summikta Zêtêmata ap. Nemesium *On the Nature of Man* 39,5-11 Morani (an earlier edition incorporated in H. Dörrie's ed. of the Porphyry) 39,5-11 Morani **20(b)(7)**
ap. Philoponum *contra Proclum* Rabe 148,7-15 **8(b)(2)**; 148,25-149,6 **8(b)(3)**; 521,25-522,23 **23(a)(13)**
ap. Proclum *in Tim.* 1.306,31-307,7; 307,14-19 **8(e)(4)**; 1.396,3-26 **6(f)(12) 7(a)(1)**; 2.11,10-13 **20(e)(8)**
Priscian
Metaphrasis in Theophrastum, *CAG* suppl. 1.2 9,7-25 **19(b)(13)**
Proclus
de Dec. Dub. Boese Q. 1.2 **3(a)(19)**; 1.4 **3(a)(20)**; 1.5 **3(a)(21)**; 2.6 **3(a)(17) 4(a)(10)**; 7.43 **4(a)(18)**
ET Dodds 18 **6(f)(11)**; 30 **6(b)(3)**; 31 **6(b)(1)**; 56-7 **6(i)(1)**; 80 **6(h)(3)**
in Parm. Cousin 958,30-35 **3(a)(18)**; 983,1-3 **6(e)(1)**; 1226,26-1228,26 **11(b)(2)**
in Remp. Kroll 2.162,20-163,9 **20(e)(3), 20(e)(6)**; 2.162,24-8 **20(f)(3)**; 2.198,25-9 **13(d)(2)**
in Tim. Diehl 1.3,14-19 **6(e)(4)**; 1.6,29-7,2 **23(a)(19)**; 1.262,6-9 **5(f)(8)**; 1.263,19-30 **6(d)(1)**; 1.266,28-268,6 **8(d)(2)**; 1.268,2-6 **22(f)(5)**; 1.310,15-21 **8(e)(8)**; 1.311,19-20 **8(e)(7)**; 1.352,5-16 **3(a)(11)**; 1.396,3-26 **7(a)(1)**; 2.8,20-5 **23(a)(7)**; 2.8,20-7 **19(b)(2)**; 2.9,8-18 **23(a)(8), 19(b)(5)**; 2.10,3-7 **19(a)(6)**; 2.43,20-44,24 **23(a)(9)**; 2.43,29-44,24 **19(b)(3)**; 2.49,25-50,12 **23(a)(18)**; 2.50,3-5 **23(b)(9)**; 2.254,13-14 **20(e)(5)**; 3.27,18-28 **11(d)(10)**; 3.56,12-57,6 **24(a)(6)**; 3.57,28-58,4 **11(b)(3)**; 3.83,18-84,1 **11(b)(4)**; 3.95,34-96,32 **24(a)(7)**; 3.272,5-28 **5(h)(2)**; 3.273,9-12 **4(b)(2), 5(h)(3)**; 3.273,19-21 **5(g)(3)**; 3.297,21-298,2 **20(e)(2)**; 3.303,15-19 **4(e)(22)**
Hypotyposes Manitius 3.73, 76,17ff. **24(a)(3)**; 7.50-8, 236,10-238,27 **24(a)(5)**
On the Existence of Evils Boese 3,6-11 **4(e)(15)**; 27,11-17 **1(h)(3)**; 38,1ff. **4(f)(4)**; 38,25-30 **4(e)(16)**; 41,23-5 **4(e)(12)**; 45,15-17 **4(f)(5)**; 48,16-20 **4(e)(19)**; 50,1-41 **4(e)(18)**; 52,2-22 **4(e)(20)**; 55,6-15 **4(e)(21)**; 60,1-4 **4(e)(11)**; 61,16-17 **4(e)24**
Prov. Boese 2.3 (6-9) **4(b)(3)**; 3.13 (5-12) **4(b)(4)**; 3.14 (1-5) **4(b)(5)**; 16. 63,1-64,4 **3(a)(16)**
On Light ap. Philoponum *contra Proclum* Rabe 18,16-19,12 **19(b)(4)**
ap. Simplicium *in Cael.*, *CAG* 7 660,7-8 **20(b)(8)**
ap. Simplicium *in Phys.*, *CAG* 9 612,1-35 **20(e)(7), 20(f)(4)**; 612,24-613,1 **13(d)(1)**; 613,14-20 **20(d)(8)**
ap. 'Simplicium' *in DA*, *CAG* 11 134,5-13 **20(b)(9)**
Sallustius
On the Gods Rochefort 20 **10(g)(4)**
Sextus
Math. Mutschmann 10.312 **18(c)(3)**
Simplicius
in Cael., *CAG* 7 12,16-27 **23(a)(21)**; 21,22-5 **22(f)(9)**; 32,1-29 **24(a)(2)**; 66,33-67,5 **23(a)(11)**; 85,7-9 **19(b)(15)**; 85,7-15 **23(a)(10)**; 85,31-86,7 **23(a)(20)**; 133,29-134,9 **23(b)(11)**; 138,2-16 **9(b)(3)**; 264,22-5 **22(f)(2)**; 264,25-265,9 **22(f)(1)**; 266,3-17 **22(f)(4)**; 266,29-267,6 **22(f)(3)**; 267,29-268,4 **22(b)(1)**; 269,4-6

22(b)(2); 285,21-7 **14(b)(3)**; 347,20-4 **9(a)(6)**; 361,10-15 **9(h)(3)**; 363,4-11 **4(e)(14)**; 380,29-381,2 **1(d)(9)**; 382,9-19 **1(d)(18)**; 387,12-19 **1(d)(10)**; 440,1-19 **23(d)(3)**; 441,2-21 **23(d)(5)**; 442,4-12 **23(d)(1)**; 444,6-8 **23(d)(4)**; 444,33-445,3 **24(a)(8)**; 488,3-24 **24(a)(1)**; 504,17-506,3 **24(a)(4)**; 519,9-11 **24(a)(9)**; 541,13-542,3 **24(a)(10)**; 648,19-23 **10(b)(3)**; 660,26-661,14 **20(b)(10)**; 731,25-9 **Introduction**

in Cat., *CAG* 8
48,11-33 **17(d)(1)**; 217,32-6 **6(f)(16)**; 237,25-238,4 **21(a)(7)**; 284,12-285,8 **21(a)(6)**; 287,12-24 **21(a)(8)**; 350,16-32 **11(d)(11)**; 351,8-18 **11(d)(12)**; 361,7-362,33 **13(f)(2)**; 364,22-9 **13(g)(10)**; 416,29-417,1 **4(e)(23)**; 418,3-6 **4(e)(17)**

in Phys., *CAG* 9-10
3,16-19 **6(e)(2)**; 167,2-17 **10(b)(1)**; 227,23-228,20 **17(e)(6)**; 227,23-6 **18(c)(1)**; 229,5-7 **17(e)(3)**; 230,17-21 **17(e)(4)**; 230,21-33 **17(e)(5)**, **18(d)(1)**; 232,8-13 **23(c)(3)**; 232,21-30 **17(e)(2)**; 270,35-271,22 **1(g)(1)**; 286,20-287,25 **1(d)(12)**; 312,18-314,15 **1(b)(8)**; 316,22-26 **6(e)(3)**; 374,18-28 **4(a)(11)**; 467,35-468,3 **14(b)(2)**; 506,3-18 **9(a)(3)**; 531,3-9 **20(d)(9)**, **20(f)(5)**; 537,9-19 **17(e)(1)**; 539,8-542,12 **17(f)(2)**; 577,10-16 **15(b)(1)**; 595,15-26 **13(b)(2)**; 601,17-19 **13(g)(15)**; 601,19-20 **13(a)(4)**; 601,19-24 **13(c)(1)**; 603,28-604,5 **13(a)(7)**; 604,33-605,2 **13(a)(6)**; 605,26-35 **13(a)(8)**; 606,32-607,9 (= FHS&G 147) **13(a)(9)**; 615,27-30 **19(b)(17)**; 616,23-617,2 **20(e)(2)**, **20(f)(6)**; 618,20-24 **13(c)(2)**; 623,11-14 **20(f)(11) and (15)**; 623,14-20 **15(a)(1)**; 623,18-20 **13(h)(1)**; 623,32-624,2 **20(e)(3)**, **20(f)(7)**; 625,13-17 **13(g)(1)**, **13(g)(6)**; 626,8-27 **13(g)(2)**, **13(g)(7)**; 627,16-17 **13(g)(8)**; 627,31-2 **13(g)(9)**; 629,8-12 **13(f)(3)**, **13(g)(4)**, **13(g)(11)**; 630,24-30 **13(h)(3)**; 631,7-31 **13(g)(3)**; 632,6-26 **13(g)(13)**; 634,11-31 **13(g)(14)**; 637,25-30 **13(f)(4)**, **13(g)(12)**, **13(g)(7)**; 638,26-7 **13(h)(2)**; 640,1-11 **13(f)(1)**; 643,16-26 **20(e)(9)**, **20(f)(8)**; 645,4-17 **13(g)(5)**; 718,13-719,18 **11(a)(1)**; 720,20-6 **11(g)(1)**; 721,16-26 **11(g)(2)**; 722,30-4 **11(e)(13)**; 760,11-26 **11(d)(4)**; 760,33-761,5 **11(d)(5)**; 766,13-19 **11(d)(6)**; 797,27-36 **11(e)(3)**; 800,21-4 **11(e)(12)**; 859,16-27 **2(c)(9)**; 861,5-26 **2(c)(5)**; 966,5-12 **19(b)(16)**, **20(e)(4)**, **20(f)(9)**; 1175,35-1176,4 **9(b)(1)**; 1177,29-32 **9(b)(2)**; 1180,6-10 **9(a)(8)**

'Simplicius' *in DA*, *CAG* 11
3,4-6 **1(d)(24)**; 120,31-34 **6(f)(6)**; 131,38-132,3 **19(b)(20)**; 133,30-5 **19(b)(12)**; 134,5-20 **19(b)(14)**; 134,5-13 **20(b)(9)**

Stephanus
in Int., *CAG* 18.3
34,34-35,10 **5(c)(2)**

Stobaeus
edition used in Wachsmuth vols 1 and 2, Hense vols 3 and 4, cited by volume, page, and line
Arius Didymus (fr. 28) 1,153,24-155,14 **20(c)(2)**; Iamblichus *Letter to Sopater*, 1,81,8 **5(g)(4)**; Iamblichus *On the Soul*, 1,365,7-14 **8(e)(5)**; Iamblichus *On the Soul*, 1,378,25-379,6 **4(g)(5)**; Iamblichus *On the Soul*, 1,380,6-19 **4(g)(6)**; Porphyry *ap.* Iamblichum *On the Soul*, 1,365,7-21 **8(e)(5)**; Strato 1,200,21-2 **23(a)(2)**

Strato
ap. Stobaeum, Wachsmuth 1,200,21-2 Wachsmuth = Aëtius 2.11.4 Diels, *Dox. Gr.* **23(a)(2)**

Syrianus
ap. Proclum *in Tim.* 1.310,15-21 **8(e)(8)**

in Metaph., *CAG* 6.1
85,15-28 **19(b)(1)**, **20(e)(1)**; 85,27-8 **20(f)(2)**; 117,25-118,11 **8(d)(1)**
Taurus
ap. Philoponum *contra Proclum* Rabe
145,13-147,25 **8(b)(1)**; 146,8-13 **5(e)(5)**; 520,23-521,6 **23(a)(12)**, **23(a)(17)**
Themistius
in DA, *CAG* 5.3
120,17-21 **11(d)7**
in Cael., *CAG* 5.4
14,12-15 **23(b)(8)**
in Metaph. 12 in Averroes *in Metaph. 12*
Bouyges III 1492-4, translated by Genequand from Arabic **1(b)(16)**
in Metaph. 12.6, pp. 12-13 Badawi, Arabic = *CAG* 5.5 Landauer, Hebrew with Latin translation, translated by Bos from Arabic, with missing sections supplied from Hebrew *CAG* Latin pages 14,22-7 **9(d)(1)**; from Arabic with Hebrew, *CAG* Latin pages 14,27-15,10 **9(e)(1)**
in Phys., *CAG* 5.2
60,9-14 **4(a)(13)**; 69,8-20 **2(b)(2)**; 121,1-4 **13(b)(3)**; 133,31-134,31 **20(f)(12)**; 163,1-7 **11(d)(6)**
Theophrastus
de Igne Coutant
4-6 **23(a)(1)**
ap. Simplicium *in Cat.*, *CAG* 8
435,28-31 (included in FHS&G 153A) **2(c)(6)**
ap. Simplicium *in Phys.*, *CAG* 9
107,12-16 (FHS&G 155C) **19(d)(2)**; 412,31-413,9 (FHS&G 153B) **2(c)(7)**; 604,5-11 (FHS&G 146) **13(a)(5)**; 639,13-22 (FHS&G 149) **13(e)(1)**
ap. Themistium *in Phys.*, *CAG* 5.2
197,4-8 (= FHS&G 155B) **19(d)(3)**
Xenarchus
ap. Simplicium *in Cael.*, *CAG* 7
21,33-22,17 **23(a)(3)**; 23,31-24,7 **23(a)(4)**